Traffic Quarterly

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Editorial

OUR HIGHWAY system is a mark of our progress in transportation—every year a new and bigger mark. It is a credit to our foresight, our financial strength, and to our ingenuity in highway engineering. The task has been prodigious. It is a commonplace remark that we have the greatest highway system in the world.

Yet, every day we hear cries for more roads. Sound argument is advanced to support our need for additional highways, better highways and the improvement of existing ones. Our transportation system has been made possible by our national expansion and the unification of the widely separated sections of our nation.

It has provided access to our vast resources and contributed to our national wealth. It has brought our people into closer association and broadened our knowledge, thus helping our thinking and understanding. It has created a unity of purpose and the enjoyment of a high degree of civilization.

Road mileage measures our accomplishment. But recognition of existing inadequacies should spur our thinking toward improvement and modernization of existing highways, and the building of better new ones.

The purpose of many excellent and expensively built highways is in effect defeated by cross-way interference, congested sections, promiscuous parking, night and weather hazards, poor vehicle maintenance, divided responsibility, misguided effort and local inertia.

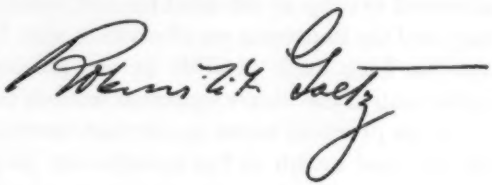
Many of our finest highways that are beautifully built, examples of engineering skill, perfectly landscaped, quickly become fringed with a low order of roadside development restricting their planned efficient use and creating the worst type of accident hazards.

Many of these hindrances can be largely eliminated by intelligent effort, improved engineering and the inclusion of preventive measures in original planning.

It is conceivable that results from effective effort in this direction might compare favorably with new roads destined to encounter similar roadside obstacles—obstacles to their efficient use or the full attainment of their purpose.

To surmount some of the problems will require broader and better designs uninfluenced by special interests, improved methods of forecasting consequent future requirements, advanced engineering, further progress in scientific research and increased original outlay of funds.

The problem of providing suitable highways to fully meet our needs is not new, but is of increasing national importance to our continued welfare and the national security.



Improving the Traffic Access to Sacramento's Business District

D. J. FAUSTMAN

Mr. Faustman has been the Traffic Engineer for the City of Sacramento, California since 1948. Previously he was Assistant Planning and Traffic Engineer for Sacramento and Transportation Engineer for the California Public Utilities Commission. During 1937–8 he studied at the Bureau for Street Traffic Research at Harvard University and during the war was engaged in research and development of Traffic equipment for the Traffic Control Branch of the Engineering Board at Fort Belvoir, Virginia.

A TEMPORARY one-way street system was initiated in Sacramento on August 20, 1948, to accommodate traffic detoured by closure of the 12th Street subway for reconstruction. For about thirteen months all traffic entering and leaving the northern city limits used the one-way street system on 15th and 16th streets. Upon the completion of the subway and reopening of 12th Street, one-way traffic was abandoned by virtue of City Council Resolution No. 822, dated July 22, 1949, which rescinded Resolution No. 578, dated April 16, 1948, establishing one-way traffic on 15th and 16th streets between C and Q streets.[1]

In the meantime the State Division of Highways had requested that the one-way street plan be continued in effect on a permanent basis and extended to include 12th Street from the north city limits to F Street and 15th Street from Q Street to Broadway. No action was taken on this request made by letter dated July 1, 1949, and signed by C. H. Whitmore, District Engineer. Engineers of the Division of Highways discussed this proposal at a special meeting of the City Council on September 20, 1949. Concluding the discussion at this meeting, the City Council adopted unanimously Resolution No. 843, instructing: "the City Traffic Engineer make a study of

[1] Since the article was set in type, the Sacramento City Council has approved the one-way street plan outlined by the author and has directed that the necessary preliminary steps be taken to put it into operation.—The Editors.

traffic conditions on 15th Street and 16th Street and report back to the City Council."

Subsequent to the passing of this resolution, the Junior Chamber conducted a public opinion poll on one-way streets and submitted the results of the poll to the City Council on October 7, 1949, with the request that the Traffic Engineer's report on the 15th and 16th street one-way system be expedited. After considerable discussion of the request, the Council directed that the City Manager instruct the Traffic Engineer to submit an overall report on a comprehensive system of one-way streets. This directive was broadened by the Council on October 21, 1949, to include a consideration of the widening of various streets in connection with the Major Street Plan.

The scope of the report has been limited to the area of the "Old City" bounded on the east by Alhambra Boulevard, on the south by Broadway, and on the west and north by the city limits. The problem of traffic congestion and its solutions are materially different in the newer areas of the city because of varying street widths and lack of parallel streets along the principal arterials.

Basic Considerations

The phenomenal growth of motor vehicle use in the Sacramento area has taken place on streets and roads designed in a pre-motor vehicle era. Actually, the basic city street system was laid out during the 1849 Gold Rush days. The street pattern laid out then did not contemplate the automobile. As a result, present traffic finds the system, in general, inadequate to handle the load properly because of narrow widths, frequent intersections and other impediments to uninterrupted flow.

Although the ultimate solution to traffic congestion, accidents, and other symptoms of street inefficiency will, in many cases, involve heavy capital expenditures for roads of advanced design, no less a task is the application of measures capable of extending the utility of existing facilities to their maximum efficiency and capacity. Broadly speaking, these measures include, but are not limited to, pavement markings, synchronized traffic signals, signs, turning controls, improved street lighting, and one-way streets.

These measures are in part emergency or temporary measures to be applied pending the time when new construction can accomplish a more complete solution. This new construction will probably be of freeway design such as is now under construction in the San Francisco and Los Angeles areas. The State Division of Highways has already set forth a proposed system of arteries for the Sacramento area and the City Planning Commission is engaged in revising its Master Plan with a view to correlating it to this proposed state highway system.

Traffic Trends

A quantitative picture of the growth of travel in Sacramento can be obtained by comparing the actual number of automobiles counted on the city streets year by year. Figure 1 shows the trend from 1927 through 1949. The graph is generally self-explanatory with decreases in traffic flow noted only during the depth of the depression in the early thirties and during gas rationing in World War II. Of most

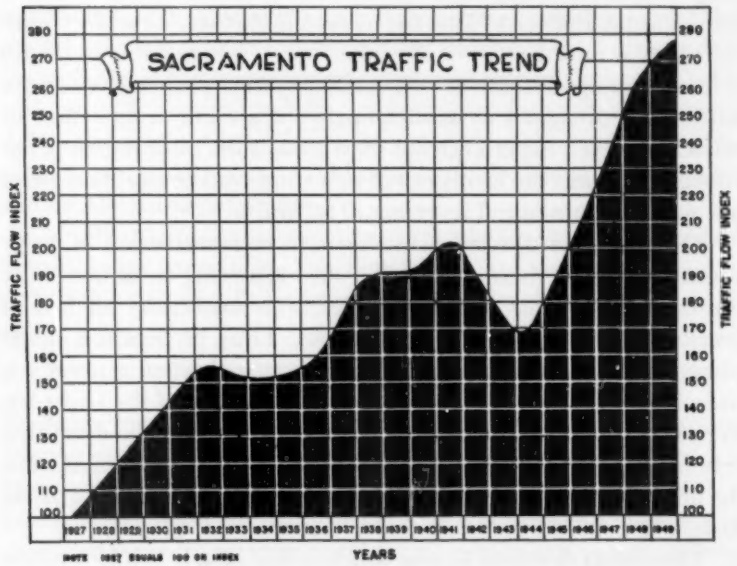


FIGURE 1

immediate interest is the fact that the total increase since the end of the war is 45.2 per cent. Although there was a slight decrease in 1949 in the rate of growth, no appreciable leveling off of traffic flow is indicated for a number of years to come.

It is this fact that traffic is constantly increasing that points up the need for some type of improvement which will afford immediate relief and also be capable of properly accommodating the anticipated increase in traffic flow.

Traffic Pattern

In studying the overall pattern of traffic flow in Sacramento, the best source of data is the State Division of Highway 1948 Traffic Survey of the Sacramento Area. The following is extracted from this report:

"Traffic in a large city is complex and characterized by constant and rapid change from hour to hour. An individual's impression of it is likely to be based on experience gained when he himself is involved in the movement; thus the commuter's impression differs from that of the shopper. However, even with the aid of masses of statistics and numerical data, the pattern is obscure. True, by counting the flow on this, that or the other street, it is possible to obtain information upon which to base traffic or parking regulations or the adjustment of signals so as to arrange for a more orderly flow of traffic. However, experience has shown that such information is not enough to permit the laying out of new routes or the modification of old ones with substantial assurance of accuracy.

"It has been suspected many times from examination of traffic counts that large volumes of traffic were following indirect routes, but the traffic counts themselves offered no satisfactory method of measuring the amount of indirect travel. Thus, on occasion, unexpectedly large increases of traffic have occurred when a street has been improved and the practical working capacity of the street has been reached before the date originally anticipated. In short, the very intricacy of the traffic problem has been a stumbling block, and the immediate need then, is to consolidate these intricacies to a broad design."

The report develops figures which define clearly this heretofore obscure pattern:

"a. There are 328,000 auto and truck trips daily in the area (metropolitan Sacramento.)

b. 41 per cent of all auto and truck trips have origin or destination in the central business district.

c. The peak traffic periods account for 42 per cent of all trips that occur between 6 AM and 10 PM, and are distributed 7 to 9 AM—17 per cent, and 4 to 6 PM—25 per cent."

In other words, the major difficulty is a concentrated peak period movement into and out of the central business district with the pattern shown in Fig. 2 in contour map form of the auto and truck trip desires. The shape and coverage of the high trip desire contours, i.e., the black and heavy cross-hatched areas, are to be noted as indicating the predominant east-west movements and north-south movements into and out of the central business district. These movements are presented in a different way in Fig 3. In this diagram the width and direction of the band show the total movements.

How these movements are actually being carried at present on our existing street system is shown in Fig 4, the 1949 traffic flow map. Specifically, it is to be noted that the eastward movement from the central business district is being carried on H, I, J, K, L streets, and Capitol Avenue, the southward movement by 3rd, 5th, 9th, 10th, 15th, and 16th streets, and the northward by 12th and 16th streets. All these streets are acting as feeder arterials to the central business district, particularly in the "old city limits" bounded by Broadway and by Alhambra Boulevard.

A traffic plan designed to improve circulation should be based on providing for present and future volumes into and out of the central business district following the pattern developed in Figs. 2, 3, and 4.

Street Capacity

Probably the chief factor in limiting street capacity and creating congestion is the narrow lane width on the 48 foot street of the grid system. Allowing for two 7 foot parking lanes (which allowance is in itself inadequate for many vehicles such as trucks and buses), the usable street width for moving vehicles is 34 feet, or 8-½ feet per lane. The State Vehicle Code permits a maximum vehicle width of eight

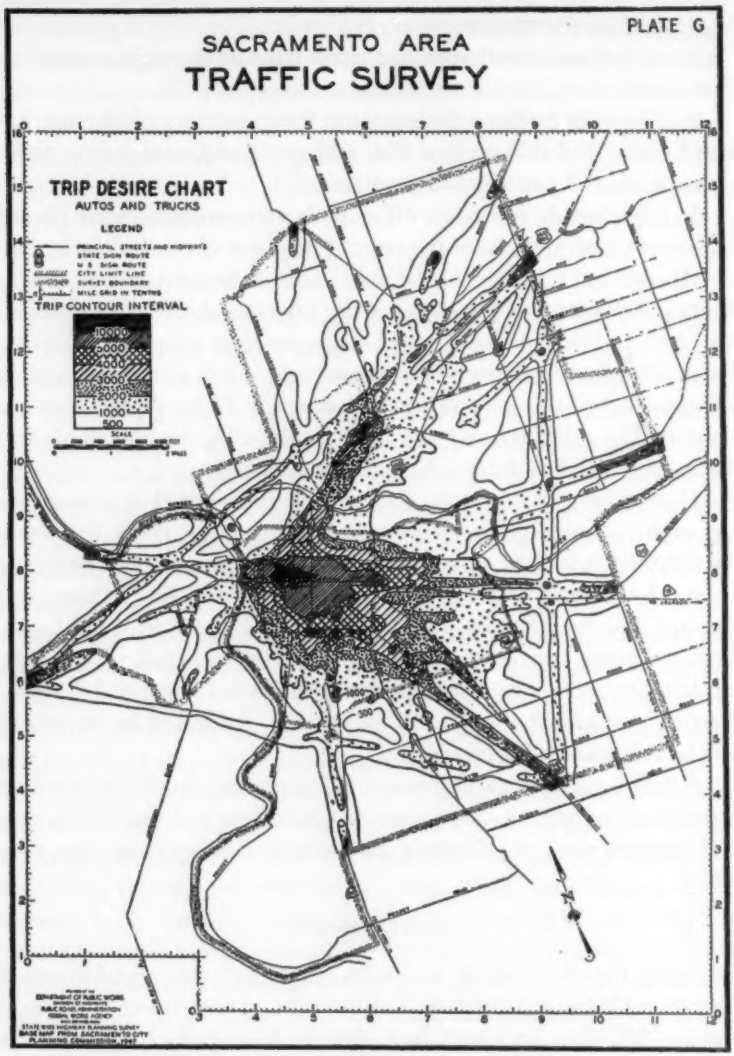


PLATE G
SACRAMENTO AREA
TRAFFIC SURVEY
TRIP DESIRE CHART
AUTOS AND TRUCKS
LEGEND
PRINCIPAL STREETS AND HIGHWAYS
STATE SIGN ROUTE
U. S. SIGN ROUTE
CITY LIMIT LINE
SURVEY BOUNDARY
MILE GRID IN TENTHS
TRIP CONTOUR INTERVAL
10000
5000
4000
3000
2000
1000
500
SCALE
STATE-WIDE HIGHWAY PLANNING SURVEY
BASE MAP FROM SACRAMENTO CITY
PLANNING COMMISSION 1947

FIGURE 2

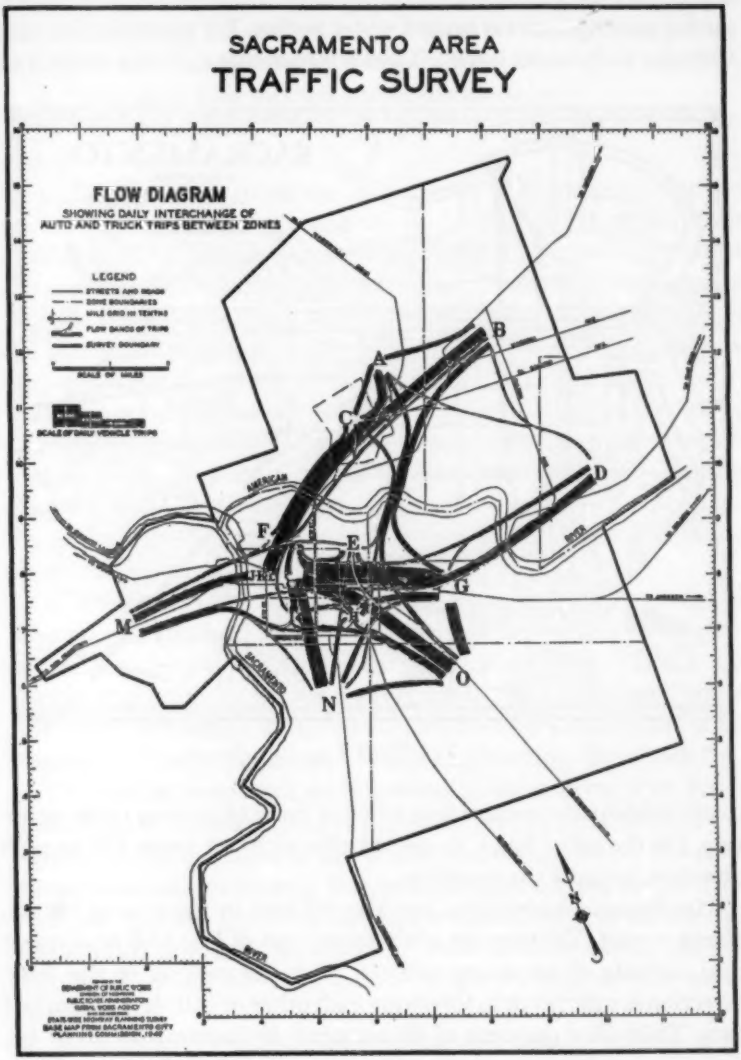

SACRAMENTO AREA
TRAFFIC SURVEY
FLOW DIAGRAM
SHOWING DAILY INTERCHANGE OF AUTO AND TRUCK TRIPS BETWEEN ZONES
LEGEND
STREETS AND ROADS
ZONE BOUNDARIES
MILE GRID IN TENTHS
FLOW BANDS OF TRIPS
SURVEY BOUNDARY
SCALE OF MILES
SCALE OF DAILY VEHICLE TRIPS
A
B
C
D
E
F
G
M
N
O
AMERICAN
RIVER
SACRAMENTO
RIVER

FIGURE 3

feet; most trucks are designed on this basis. Further, the trend in late model passenger cars is toward wider bodies. For example, the 1950 Chrysler body width is 6'8". Thus it is seen that a 48 foot street is ac-

FIGURE 4

tually inadequate to carry four efficient lanes of moving traffic properly. On the other hand, to allow traffic to move single file in each direction is out of the question.

Inadequate lane-widths are also evident in examining the accident record. Vehicles are often forced out of line and head-on or into the side of oncoming vehicles. Vehicles moving in the same direction are more apt to sideswipe each other or collide with parked cars. Thirty-five per cent of all accidents in Sacramento occur between intersections.

There are several ways in which street capacity may be increased.

Although in some instances intersectional conflicts are the critical factors in creating congestion, street widths are the most important factor in determining capacity. Street capacity may be increased:

a. Widening. This method will be discussed later.

b. One-way streets. The major portion of this paper will deal with this technique.

c. Prohibition of parking. It is a generally accepted principle that the needs of moving traffic should have precedence over curb parking, and within reason, over curb loading. In Sacramento street capacity could be obtained when it is most needed by a parking prohibition during the peak hours of 7–9 AM and 4–6 PM. Because of the practical difficulties of properly enforcing a complete prohibition of parking, to include the ill-will generated among the motorists whose cars have been towed away and impounded, this method of increasing street capacity is not looked upon with favor. The current unsatisfactory situation in San Francisco is cited wherein there is almost a complete disregard for the No Parking signs. Further, San Francisco is finding that there are practical operating difficulties to the removal of parked vehicles by tow car.

d. Off-center lane movement. Some cities, notably Los Angeles, have successfully used the plan of assigning extra traffic lanes to accommodate heavy uni-directional peak-hour flows. Certain important conditions of flow and street width must be present before such a plan is feasible. These conditions are well summarized in the Institute of Traffic Engineers "Traffic Engineering Handbook."

"Vehicular movement on important traffic arteries, with *five* or more lanes of moving traffic is improved during peak hours by assigning additional lanes to the predominant movement. Normally the predominant movement is in one direction during the morning peak and opposite direction during the afternoon peak and in each case should comprise at least 65 per cent of the total volume. At least *two* lanes should be reserved for traffic moving in the minor direction."

In Sacramento it is concluded that this type of control is not practical on a 48 foot street unless parking is removed (which is not favored) and further, traffic flows are not unbalanced in direction

during the peaks. For example, on 16th Street between C and D streets during the evening peak, outbound traffic comprises 57 per cent of the total.

One-Way Streets

Experience in Sacramento during the thirteen months that 15th and 16th streets operated under one-way traffic, and experience in other cities where one-way streets are in use, indicates that certain definite results can be achieved by the adoption of one-way streets. The end products of one-way street operation are essentially an increase in street capacity and a reduction in accidents. The various factors contributing toward the achievement of these results will be discussed in the light of Sacramento experience as well as the experience in other cities. Both advantages and disadvantages of one-way streets will be brought out in detail in this section.

Reduction in Accidents

The application of one-way traffic to a street system brings about many basic changes in traffic behavior. It is from these basic changes and not from luck that benefits are derived.

One of the best examples of the basic changes in traffic behavior is the reduction of accidents on 16th Street during one-way operation. Only the direction of travel was changed on this street, no new signals or stop signs were installed, thus any change in accident experience is directly attributable to the change in direction of flow.

ACCIDENT EXPERIENCE, 16TH STREET BETWEEN C & Q

	Two-Way Street Jul. 30, 1947–Aug. 19, 1948 (387 days)	*One-Way Street Aug. 20, 1948–Sept. 10, 1949 (387 days)*
Total Accidents	286	246
Per cent change		−14.0%
Accidents per million miles of travel	35.3	30.8
Per cent change		−12.7%
Intersection Pedestrian Accidents	10	7
Per cent change		−30.0%

During the two 387 day periods under study, city-wide accidents rose from a total of 3948 to 4604, an increase of 16.6 per cent.

To summarize, there were 14 per cent fewer accidents on 16th Street during one-way street operation than during two-way operations in face of a city-wide accident increase of 16.6 per cent during the same period.

The reasons for this accident reduction are as follows:

1. Reduction in conflicting movements at intersections: Potential points of conflict between vehicles such as that between left-turning and oncoming through-traffic are reduced from 16 to 5; between vehicles and pedestrians from 16 to 10; thus expediting traffic operations and reducing the probability of collision.

2. Elimination of head-on collisions: With two-way operations in narrow lanes, vehicles are often forced out of line by wide vehicles and head-on into the side of oncoming vehicles.

3. Elimination of headlight glare: Glare is an important factor in traffic safety at night, and is probably responsible for more pedestrian accidents than for vehicle accidents.

4. Increase in lane width: The 8½ foot traffic lanes and 7 foot parking lane used in two-way operation are too narrow to safely accommodate modern vehicles. Sideswipe accidents between vehicles moving in the same direction and collisions with parked cars are minimized with the 11-1/3 foot traffic lanes used in one-way operation.

5. Elimination of trapping of pedestrians between opposing streams of traffic: With the platoon effects developed with one-way traffic by traffic signals, a break in traffic occurs for the whole width of the roadway.

6. Continuous flow: Improved signal timing minimizes rear-end collisions.

Speed and Delay

An important advantage of a one-way street system is the facility of movement obtained, particularly during peak periods. This is accounted for by several factors:

1. Reduction in turning conflict at intersections.
2. Improved signal synchronization since only uni-directional

movement must be provided for in the mathematical computations of the time-distance relationship involved in timing signals.

3. Increased lane width.

The experience and data obtained on speed and delay during the operation of the 15th-16th street one-way system may be considered as typical of what may be expected on other congested streets. Speed and delay studies were made both during peak and off-peak hours. In making these studies the "floating-car" method was used. An observation vehicle was driven so as to "float" with traffic, care being taken that it was driven neither faster nor slower than the general movement of passenger automobiles. All traffic regulations were strictly observed except those specifying speed limits. The general movement of traffic was the sole guide for speed. In order to obtain a true average picture, approximately 250 floating-car runs were made under one-way and two-way conditions.

The results of this extensive study on 15th and 16th streets are tabulated as follows:

	Average speed		*Per cent change over two-way*
	Two-way system	*One-way system*	
Peak Hours			
AM and PM	12.7 mph	15.8 mph	+ 24.4%
Other hours	13.3	18.8	+ 41.4%

Cost of Accidents and Delay

To obtain the greatest public benefit from a street or highway improvement, some tangible measure should be made of the benefits. Some yardstick should be applied to determine the overall gain to the community resulting from the improvement, or conversely, the loss from not having the improvement.

Among the more important public benefits from a plan designed to minimize congestion are a reduction in travel time, a reduction in accidents, and a saving in fuel. Typical of the benefits accruing as a result of one-way operation is the following tabulation developed by the State Division of Highways on the 15th and 16th street experience:

	Two-Way Street	*One-Way Street*	*Savings One-Way over Two-Way*
Annual Gasoline (Gallons)	2,689,200	2,429,800	259,400
Value			$70,038
Annual Travel Time (vehicle minutes)	94,351,000	70,399,000	23,952,000

These figures serve to emphasize the fact that there is a large saving to the collective motorists who use the streets and highways resulting from one-way street operations. Similar figures could be developed for other streets proposed for improvement.

Another extremely important cost of congestion, but one that is intangible and difficult to measure, is the tendency to discourage business and shopping travel into the central business district because of congested feeder arteries. The freedom of movement into the central district must be maintained if the integrity of business (and its large tax base) is to be preserved.

The reduction in accidents on one-way streets should be recognized as being of economic value to the community as a whole. If the 14 per cent reduction factor experienced on 16th Street is applied to the annual accident experience of the streets proposed for one-way operation, it is estimated that there will be 211 less reported accidents. Using National Safety Council figures on accident costs, the total saving will be $472,500. This is a sizable monetary saving and, of course, the saving in suffering and misery cannot be measured.

Effect on Business and Land Values

Contrary to popular claim by individual businesses or business groups, survey data compiled by the State Division of Highways from State Board of Equalization records indicate that one-way streets do not, on the whole, unfavorably affect the gross volume of business transacted. Comparison of the business volume index of the fourth quarter of 1948 and the first and second quarters of 1949 for all businesses in Sacramento County to that of businesses located on one-way streets in Sacramento discounts claims of business loss due to change-over from two-way to one-way streets. In the following table the percentage figures indicate the changes in gross business

between a nine month period (fourth quarter of 1947 and first two quarters of 1948) when two-way traffic was in effect on 16th Street, and a nine month period (fourth quarter of 1948 and first two quarters of 1949) when one-way traffic was in effect on 16th Street.

	Sacramento County	*Sacramento City One-Way Streets*
Auto Supply Stores, Garages, Auto Dealers, Service Stations, and Tire Shops	−4.67%	−2.9%
Eating and Drinking Places	−7.18%	−3.98%
All other businesses	−0.43%	+8.6%
All Businesses	−1.30%	+2.09%

This sales tax comparison is shown another way in Fig. 5. It is to be observed that the trend of business on 16th Street parallels closely business activity throughout the county.

In an effort to determine the effect of one-way streets on land

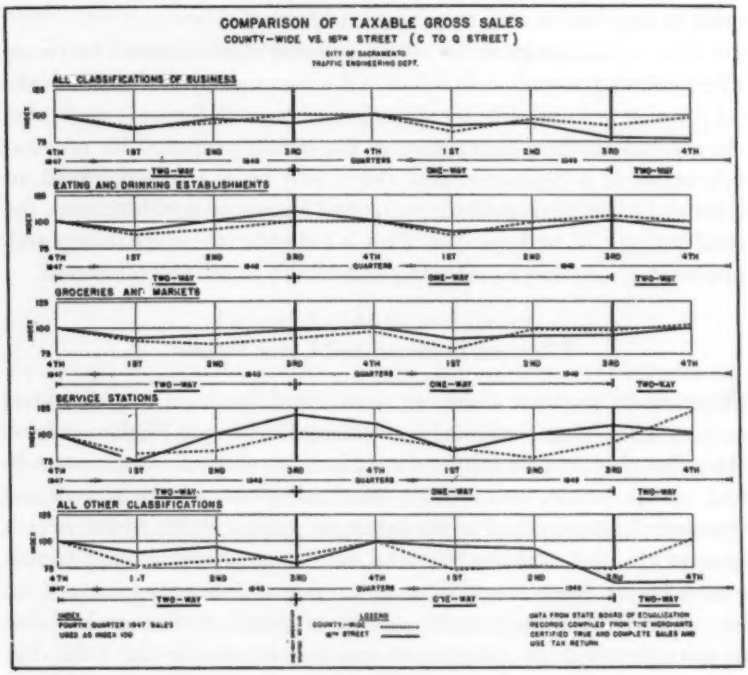


FIGURE 5

values questionnaires were mailed in October 1949, to the assessors of 53 cities, comparable to or larger than Sacramento, in which it was asked what effect one-way streets had on valuation of abutting property. Of the 42 cities reporting as having one-way street systems, two indicated an increase in assessed valuation, one a decrease and the 39 others, no effect. Of special interest is the reply of the city of Madison, Wisconsin in which it was stated that in the eight blocks bounded by one-way streets competition among the mercantile organizations to obtain locations in the area is quite severe and has been increasing.

Of the forty-two cities reporting, at least twenty have had one-way streets for five years or more. Of these twenty cities, eight have one-way streets in the residential area, none of which reported a decrease in assessed valuation as a direct result of one-way streets. It would appear, on the basis of reports received from the various cities that the advent of one-way streets has had little, if any, effect on the use of property bordering thereon, whether the property be used for business or residential purposes. It is believed that this conclusion should be carefully studied before acceptance as a general rule.

In the majority of cases, one-way streets are converted from former two-way major traffic arteries. There are usually, before a change-over to one-way streets, several undesirable conditions already present which tend to detract from the value of the property whether it be utilized for residential or business purposes. Such conditions are dust, noise, congestion, and at peak hours, general confusion. The change-over to one-way streets, rather than adversely affecting abutting property has the tendency to lessen these undesirable conditions. Inasmuch as the majority of property is already occupied by existing buildings, there is little trend toward a general change in land use.

If however, a minor thoroughfare which is generally devoted to residential use and has few undesirable conditions associated with heavy vehicular traffic present, is converted to a one-way street system, those conditions will tend to develop to a certain degree and detract from the value of bordering property for single-family dwelling purposes. If the majority of the property is developed there is little that can be done to alleviate such conditions. If, however, the prop-

erty is only partially developed there will be a tendency toward construction of rental units rather than single-family homes. Along lines of heavy vehicular traffic this is considered to be good planning. Because of the resulting increase in traffic there is always the request for business zoning along the flow of traffic.

In general, because of the character of streets converted to one-way traffic there is little change in either the value or existing or projected use of bordering property. What changes become evident as the result of a combination of many factors can be properly controlled as to best use of land by means of proper zoning.

Public Support

Public opinion in Sacramento generally speaking appears to favor the use of one-way streets by a predominant margin. From the expressions of opinion that have been received from various sources, it can be estimated that 80 to 90 per cent of the residents of the city and surrounding area wish to have the advantages of one-way streets.

In October, 1949, the Sacramento Junior Chamber of Commerce undertook a public opinion poll on the subject of one-way streets. The poll was conducted impartially, ballots being distributed to the public in stores in the central business district and along 16th Street, and to state employees. Ninety-two per cent of the ballots returned, or 6974, favored one-way streets while eight per cent, or 594, were opposed to one-way streets. In addition to the ballots several dozen unsolicited letters supporting one-way streets were received by the Junior Chamber of Commerce during the poll period.

Support for the establishment and maintenance of one-way streets has also been received by the City Council in lengthy communications from the following organizations: Western Highway Institute, Highway Drivers Council of California, Truck Owners Association of California, and the Sacramento Chamber of Commerce. All communications put emphasis on the increased traffic capacity, reduction of accidents, reduction in driving time, and advantages to business which accrue from one-way street operation. Of five communications received by the Council only one opposes one-way streets, and that opposition is limited to one specific street.

Other means of judging popular reaction include the Letters to the Editor columns of the daily newspapers. Here again, support for one-way street operation is nearly unanimous among the letters addressed to both daily newspapers. Editorial comment has also been practically unanimous in favor of one-way street operation. One daily newspaper has not only urged the use of one-way streets numerous times, but has also published feature articles and news stories favorable to one-way streets.

Opposition to the operation of one-way streets in Sacramento has come largely from merchants' groups and residents along the affected streets. It appears to be clear that such opposition is not directed at the principle of one-way streets, but rather at the specific instance. It must be pointed out that opposition will inevitably arise when one-way operation is considered for any specific street. Such opposition may be based largely on prejudice.

Disadvantages

Under certain circumstances, a one-way street system may increase driving distance for some motorists. However, motorists today travel in terms of time, not distance. Most of the road information contained in oil company and motor club maps give information in terms of time between points and in many cases do not even tell how far it is. In other words, even though the distance might be slightly increased for some direction of travel, the time between any given points on the one-way system is much less as has been verified by the speed and delay studies on 15th and 16th streets.

If a one-way street system is not properly marked and signed, strange motorists are apt to become confused. With the present state highway system of road marks and directional signs, directions can usually be seen just as well on one-way streets as they can on two-way streets.

Due to the necessity in some cases for cruising around the block to reach a desired destination, there are more turning movements on a one-way system than on a two-way. Since, however, both right and left turns can be made off of a one-way street without conflicting with opposing traffic, this disadvantage is not considered serious.

There has been considerable complaint regarding business losses on 15th and 16th streets. A previous section on economic aspects brings out statistics that refute this complaint insofar as the overall picture is concerned. It is recognized that if the approach facilities of a gas station, for example, are not laid out so as to be easily accessible and attractive to the motorist, some loss in trade may be experienced if the design goes uncorrected.

Street Widening

Systematic widening of major arterials feeding into the central business district would effectively relieve present traffic congestion and materially increase capacity. A suggested widening program is shown in Fig. 6.

A major consideration would be that of cost of a widening pro-

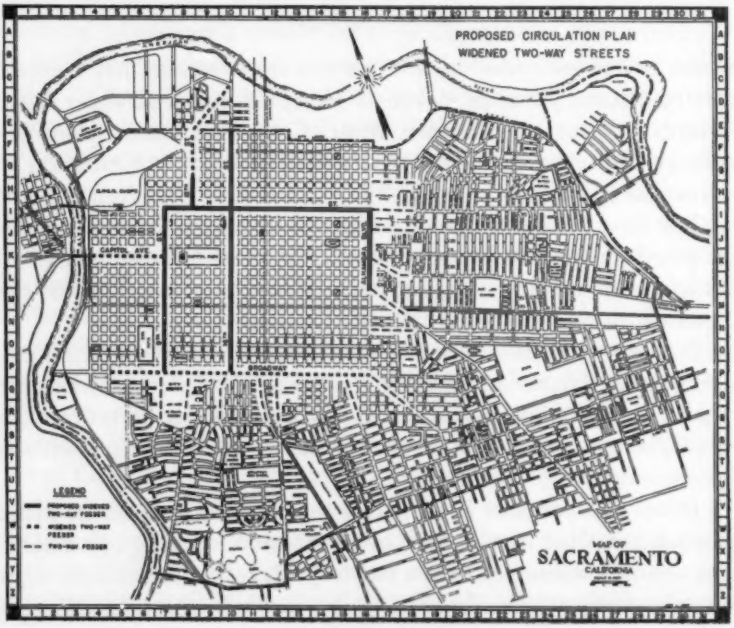


FIGURE 6

gram. The total cost of such a program is estimated at $1,306,400 based on the costs of the most recent street widening projects.

The only practicable method of financing a street widening program would be the issuance of general obligation bonds. Requiring approval of two-thirds of the votes in a general election, this method appears on the surface to be the most feasible because it would provide all the required funds for early completion of the program, and spread the cost to the city as a whole where the benefits would accrue. Two of the principal questions to be answered are probably: Are the benefits sufficient to justify the cost; and is the cost justified when less expensive alternative plans are available?

Widening of any major arterial street will provide additional capacity for moving traffic. The maximum capacity which can be gained by widening will be limited by the amount of the widening, and by the conflicting traffic movements. In Sacramento it is relatively easy and inexpensive to widen streets from 48 to 64 feet since most street rights-of-way are 80 feet wide within the old city limits. To widen streets beyond 64 feet would require in most cases the purchase of additional right-of-way and removal of buildings at costs several times those included in the estimate of $1,306,400.

Streets widened to sixty-four feet have a maximum practical capacity of 30,000 vehicles daily. Widening of Sixteenth Street would provide effective relief for a period not to exceed ten years. At the end of that time, if traffic volumes continue to increase at the present rate, congestion on Sixteenth Street will be as bad as at present, if not worse. The same statement can be applied with some extension of time to all the streets proposed for widening.

Conflict and congestion created by turning movements will not be eliminated by widening of streets. Some relief would be felt immediately following a street widening, but as traffic increases, the congestion caused by turning movements would rapidly increase, and to some extent reduce the capacity gained by the widening.

Construction of sixty-four-foot streets on an eighty-foot right-of-way reduces maximum sidewalk widths to eight feet. This is adequate for residential areas, but in retail commercial districts twelve to fourteen foot sidewalks are usually required to handle the volume of pedestrian traffic. Widening of streets through business districts

should be studied particularly in the light of pedestrian requirements.

About two and one-third years would be required to plan and construct the street widening program outlined in the foregoing. If the funds were available and if the decision were made at once, the full benefit of widened streets could not be felt before January 1, 1953.

Conclusion

After a careful consideration of facts and data set forth above, it is concluded that a comprehensive one-way street system offers the best solution of providing a feeder arterial system into and out of the central business district. The plan shown in Fig. 7 meets the necessary requirements. It can be put into effect immediately at a cost of approximately $23,000 as compared with two and one-third years and $1,306,400 for a street widening program.

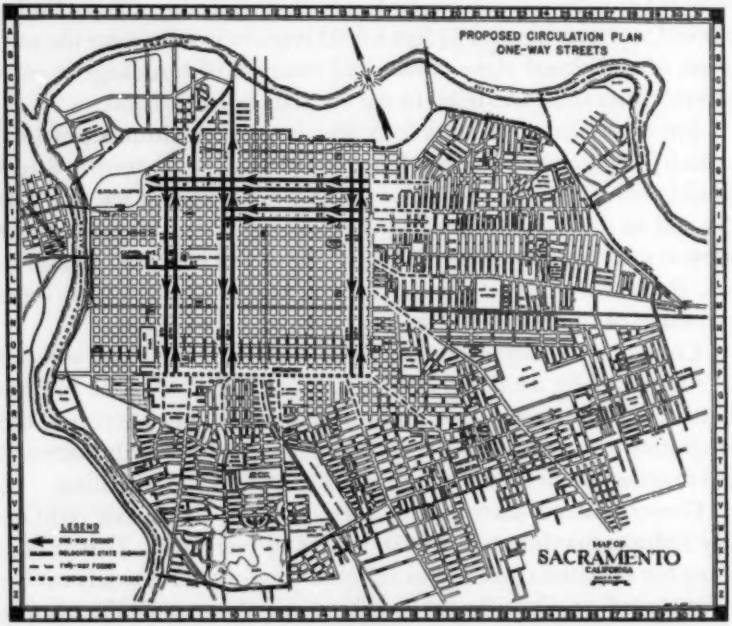


FIGURE 7

The one-way street plan is superior to the widening plan in regard to:

1. Total vehicle capacity
2. Need for tree removal
3. Speed of accomplishment
4. Safety
5. Signal timing and resultant higher average operating speeds
6. Bus operations
7. Expediting of fire equipment
8. Flexibility in meeting changing traffic patterns

Present and anticipated traffic flows on our arterial system, particularly during peak hours, point up the need for keeping abreast of and, if possible, ahead of the congestion problem. If we fail to meet the challenge of congestion, with its companion evil, lack of parking space, it will mean established values in the central business district will be depreciated. The trend of decentralization in Sacramento is known to all, particularly the shopping centers in the northeast suburban area. Freedom of access must be preserved.

Traffic Control Devices as an Aid to Traffic Improvement

GEORGE W. HOWIE

Mr. Howie has been City Traffic Engineer of Cincinnati since January 1949. Prior to that he was for five years Assistant Traffic Engineer in Portland, Oregon, after serving five years as a staff member in Portland. He also spent four years in technical publishing. This included the editorship of Trade Lanes, a weekly magazine devoted to traffic and transportation on the Pacific Coast. He is a member of the Highway Research Board Committee on Channelization and Vice-Chairman of the Institute of Traffic Engineers Committee on Traffic Control and Operation. Of this committee he is Chairman of the Sub-Committee on Traffic Signs and Markings.

EXCEPT for isolated instances fifty years ago, traffic control devices have been a development of the past thirty years. Yet in that time only a relatively small part of the public has come to understand the reasons for installing these devices, or the limitations that must be placed upon their application.

Evidence can be found at every hand. Willful violation of regulatory signs is the most frequent symptom of our failure to gain drivers' respect for the reasoning that led to installing these control devices. At the same time, the pressure put on public officials, particularly upon those holding elective office, to install unwarranted devices, shows the lack of understanding among citizens concerning the thoughtless misuse of traffic control devices.

Traffic engineers in years past have been considered "gadgeteers" by members of the older branches of engineering because traffic control devices have been regarded as window dressing of the highway—gadgets that any handyman could scatter with a reasonable degree of success. Fortunately, men exercising sound engineering thinking have proved that as much analytical ability must be used in applying engineering principles to a traffic control system as to planning the most devious engineering structures. Many professional engineer-

ing groups today accept traffic engineering as one of the important branches of their profession.

Traffic control devices can aid or hinder an orderly flow of traffic, depending upon the devices themselves and their installation. If installed solely as "safety devices," they are likely to contribute little to an efficient flow. Isolated instances of such installations may have little effect upon the overall traffic pattern, but an area-wide, or city-wide, installation of safety-only devices results in a hodge-podge that inevitably earns public ill will.

Traffic engineering has been sold largely on its merits in the field of accident prevention. Frequently, the traffic engineer is introduced before gatherings as the "traffic safety engineer" or simply as the "safety engineer."

It is true that in any community with a bad record of traffic accidents caused largely by deficiencies in traffic-control devices, the traffic engineer can pay his way many times over as a *traffic-safety* engineer.

Pursuing this philosophy to an extreme degree, he can slow vehicular traffic almost to a walking pace, install traffic signals, four-way stops, and isolated stops wherever a bad accident history develops. And if backed by a vigorous law-enforcement program he will unquestionably reduce the accidents. This fact has been demonstrated repeatedly.

Such programs have given traffic engineering a bad name in many communities. The traffic engineer is too frequently thought of as the man who puts every possible impediment in the way of free-flowing traffic. Many drivers view stop signs, channelizing islands, traffic signals, and speed signs as nuisances rather than as aids to convenient transportation.

Unfortunately, this is true in too many cases. Most traffic control devices installed without fulfilling proper warrants fall into this nuisance classification. Devices that fail to facilitate the movement of a heavier flow of traffic, even though creating inconvenience for a lighter volume, are typical examples. Stop signs placed in the way of through-street traffic flow as "speed control measures," or stopping through-street flow twenty-four hours a day at school crossings used only an aggregate of an hour a day, are easily recognized nuisance

installations. Traffic signals placed by political decision at points where warrant does not exist and where timing for progressive movement at reasonable speeds cannot be attained, have often created disfavor for all traffic signals among the driving public.

In a traffic engineer's Utopia, Stop signs would be placed only where they would facilitate the *flow* of a greater number of vehicles than are *stopped*. Traffic signals would be installed only at pre-determined intervals where they would improve traffic flow and actually permit greater speed on a major thoroughfare than could safely be permitted without the signal system.

Speed signs would be primarily of an advisory nature, intended as reliable and reasonable guides to safe, orderly movement of traffic and acting as warnings where some actual or potential hazard exists. Of course, medial islands would exist on all wide streets carrying two-way traffic, so that the pedestrian could safely cross one-half of the roadway at a time.

Somewhere between this Utopian condition and the situation actually prevailing in most communities today, there is a practical ideal toward which the use of traffic control devices should tend to carry us.

Certain important principles have been evolved in the application of traffic control devices, which are reliable guides in determining whether a contemplated installation or program will actually improve the overall traffic and transportation picture.

Questions that must be answered include:

1. Does the installation fit in with an adequately devised plan or program covering the entire area, community, or highway under study?

2. Does it conform with established standards (if they exist), not only as to form, but also as to fulfilling established warrants?

3. Is it uniform with or similar to the application which has been made or is contemplated for all like conditions within the area, community, or highway under consideration?

4. If installed, will it be adequately, properly, and completely maintained?

5. If of a regulatory nature, will it be adequately enforced?

6. Has the public been sufficiently informed as to the reasons for

the installation and how it will bring about safer, more orderly, and expeditious movement of traffic?

Fact-Based Plan Is Necessary

Hence we come to the *first* important element in the use of control devices as an aid to traffic improvement. This is that a plan be developed, based upon reliable factual data which in turn are carefully analyzed with a view to obtaining "safe, convenient, and economic transportation of persons and goods."

The first result of such planning, whether on an area-wide, statewide or city-wide basis, is bound to be the development of a major highway, major thoroughfare, or through-street system. Deficiencies in the system will almost at once become evident as the individual units of the system are compared with the load being imposed upon them.

Briefly, the facts needed for this type of planning include the following: An inventory of the existing street or highway system, together with a summation of existing traffic control devices not only as to their existence, but also as to their present condition, their compliance with established standards and their absence at obviously needed points. Traffic counts, including peak-hour flow, the 24-hour traffic pattern, composition of the traffic (number of commercial vehicles, passenger vehicles, pedestrians, etc.), and data as to unusual loads that may be imposed at critical points with recurring frequency. Data as to speed of flow, location of delays, and causes thereof. Some measure of obedience to existing traffic control devices. Analysis of the traffic accident pattern—not only as a means of accident prevention, but also (1. Excerpt from definition of traffic engineering by Institute of Traffic Engineers) to provide valuable clues as to points where inefficiencies exist in the traffic stream.

No one trained in engineering can far explore such traffic data without being confronted with the need for adding another tool in his workshop—a reliable gauge as to street or highway capacity. Traffic engineers have been handicapped for years in this respect. Their guides as to capacity have been "rule of thumb" rather than precise instruments.

Fortunately the tool is now at hand. Numerous agencies in the field, led by the Highway Research Board and the Federal Bureau of Public Roads, have contributed to development of highway capacity guides. These were published recently in Public Roads magazine and are newly available in book form.

The application of this mass of traffic information so that an orderly system of traffic control emerges is the true test of the engineer's skill. His most useful guide at this stage is adherence to standards which may be termed the *second* important element in the use of control devices as an aid to traffic improvement.

Use of standards connotes more than the adherence to certain established rules as to shape, color, size, lettering, color sequence, etc. It also requires the installation of traffic control devices in uniform locations throughout the system; and, perhaps most important of all, according to established warrants and only where warranted.

In individual cases, standards may seem of little consequence. Hence, the political-minded public administrator in particular has a tendency to seek deviation from standards so that he may obtain "special consideration" for his wants or those of his constituents. Every case in which he has been successful adds another bit of disrespect for traffic control devices, another element of confusion, another argument in favor of stricter adherence to national standards.

Every one of us, of course, has seen a non-standard, special traffic control device doing an excellent job of traffic warning or regulation. Occasionally even a sub-standard device does a pretty fair job. On the other hand, we now and then see a standard device, installed according to all the rules in the book, which is totally inadequate for the job it is intended to do. These exceptions then become arguments for more and more deviation from standards.

However, let us examine what the word standards, as applied to traffic control devices, implies:

1. Easy recognition because the motorist has seen the same device many times, and he accepts the authority which it denotes.

2. Good target value because of reasonable size, proper color and design, and well placed.

3. In the case of signals, operating according to recognized proper color sequence.

4. Installed only where actually warranted and to meet a specific need.

Many persons concerned with traffic control problems view "easy recognition" as a two-edged sword. Feeling prevails that familiarity breeds contempt and that motorists will tend to overlook warning signs seen repeatedly. Unquestionably they will do so if devices are being used where experience teaches them the device is unwarranted.

Hence, we see a constant renewal of attempts to devise novelty warning signs, particularly in the field of school zones and crossings.

There is no question that the latest model School sign creates an impression upon the motorist the first few times he sees it. Has anyone determined how many times a driver must view such a novelty before it drops back into the same class as its long string of predecessors?

The traffic administrator who tries an endless succession of such novel warning devices, each one a little more striking in appearance than the preceding one, is overlooking a basic element in traffic control: to obtain an almost subconscious, automatic reaction of obedience and respect for every driving guide and control device.

Those engaged in extensive driver testing activities find the best drivers among those who drive almost automatically, not only with respect to their driving skills but also in those elements of driving which relate to attitudes. Thus, a driver of this quality will stop for an octagonal yellow sign approximating the usual Stop-sign size, even though the wording may be illegible. He will stop, look and listen for any round sign approximating a railroad warning, and will comply with the speed control feature of a well-timed traffic signal system without consciously referring to his speedometer.

Such driver habits and attitudes are of tremendous value in the field of traffic control. They should be inculcated into the maximum possible number of drivers. If the standard type of traffic control device tends in that direction—and there is much evidence that it does—then the standard device should be adhered to as vastly superior to the novelty sign, even though the latter may seem to fit the expediencies of the moment.

Oversize Devices

Oversize devices, in all other respects standard, are however, another aspect of the question and should not be considered in the novelty class if used properly. They are warranted mainly to meet two conditions: first, on a high speed highway where the usual sign does not provide adequate readability; and second, where great target value is needed either because of high speed or because of the competition of a confusing or eye-attracting background.

Although the traffic administrator would hardly go wrong in adhering strictly to standards in the use of traffic control devices, these guides should not necessarily bar the path of constructive thinking toward better control devices. Traffic Engineering is still in a stage of development, and there are few static features in the profession.

New ideas, and improvements over existing methods, should be given a thorough local test. If they weather this, they should be submitted to the various national agencies concerned with research and development of new traffic control measures. If such an idea gets through the rather strict screening process which these agencies then will give an idea, one can be sure it has much merit.

The rugged individual who loves to develop his own ways of doing things will find plenty of room in the field of traffic control. While there are many established standards and accepted practices, there are still many things in the field of traffic control which are relatively unexplored.

Many acceptable standards have been developed for such things as traffic sign design, sign color, size of signs in relation to speed, design of lettering, traffic signal color sequence, warrants for traffic signals, speed zoning techniques, and related problems. There are still no nationally accepted standards in the field of center line markings, the marking of no passing zones, the marking of parking stalls and no parking areas, the warrant for crosswalks, the location of traffic signal units, the warrants for additional pedestrian signals where vehicular signals exist, a definite and uniform method of marking loading zones and bus zones, warrants for one-way streets and many of the basic requirements for channelization.

Also, in the field of materials for traffic control, there is much to be desired with respect to the durability of materials used in signs, the durability of street paintings, the visibility of urban street markings during unfavorable weather conditions, and the quality of reflectorization for signs used in urban locations. Present reflectorizing materials are highly acceptable for rural and state highway work, but there is no reflectorizing material now available which can successfully fulfill many requirements of urban traffic control where glare from advertising signs and street lighting provide competition which renders many traffic signs virtually useless.

The Most Important Lack

Probably the most important thing missing in the nation-wide picture of traffic control is the lack of uniformity in the application of traffic control devices. While most of the devices themselves do conform with the standards, and while there has been a reasonable adherence to established warrants, the motorists still face much variance from state to state in the actual application of these devices to a given set of conditions. Hence, uniformity may be cited as the *third* important element in this study of the use of control devices as an aid to traffic improvement.

This situation prevails even within states and occasionally it is found even along a given stretch of highway or within a city. Uniformity of application should be one of the primary guides in the work of every traffic control administrator.

One of the most serious examples of this lack of uniformity can be found on a highway on which most curves are well signed but where the survey has overlooked a few curves which the motorist finds hazardous if negotiated at normal highway speeds.

This also leads to the question of adequate maintenance. Motorists soon learn to rely upon a good job of signs and markings, and if the maintenance program fails to replace them promptly if they are damaged, covered or removed, the motorists may be led unwittingly into an extreme hazard. Therefore we must emphasize adequate maintenance as the *fourth* important step in the program of utilizing control devices in the improvement of traffic conditions.

New construction, new installations, new work which the highway user can see in his day to day travels, are a favored means for selling a political-minded administration to the voting public. Consequently, a tendency often prevails to budget considerable sums of money for new work, but to keep the maintenance budget at rock bottom levels.

Unfortunately the maintenance program that provides only for the replacement of control devices which have completely outlived their usefulness, is the rule instead of the exception. Contrasted with this may be cited the example of one Western community that places such high emphasis upon maintenance that every traffic and parking sign receives not only a cleaning, but also the application of a protective wax coating periodically. As a result, this community buys comparatively few new signs for replacement over a period of many years, notwithstanding the fact that it is a coastal community where the signs are subject to the corrosive action of salt water. Here, good maintenance results in economy of operation just as good housekeeping results in economy in household affairs.

Regulatory devices should be installed only where they can, and will, be enforced. Public contempt soon prevails where it becomes known that control devices are being ignored by the new enforcing agency or where enforcement varies from the message on the control devices.

A typical example of this arises in areas where signs are installed, ostensibly for the purpose of holding speed to low levels, such as 20 or 25 mph, while there is no intention of enforcing speeds except those in excess of a much higher level, such as 40 mph. Similar examples in the field of turning regulations, parking prohibition, and parking time-limits are common.

Traffic regulatory devices improve traffic conditions only where the meaning is clear and the device is enforced within a narrow range of tolerance beyond that meaning.

Devices which are not enforced in this manner do harm to the entire traffic control program by creating universal disregard for all traffic regulations. Then, in turn, when the motorist is penalized for violation, he resents having been picked out, he believes, as an example.

Finally, traffic control devices will be effective only where understood by the walking and driving public and where the public can understand a sound reason behind the installation. Therefore, a continuous public relations program, designed to educate and inform, is an essential element in every active program in traffic control as an aid to improvement of street and highway conditions.

Merchants and Traffic Congestion

RICHARD H. RICH*

Mr. Rich has been president of Rich's, Incorporated, a department store in Atlanta, Ga., since February 15, 1949. Previously he had been vice president since February 16, 1937. Mr. Rich, grandson of the founder of the store, started in 1923 as a wrapping clerk. Except for his war service from 1942 to 1945 he successively worked as stock clerk, marker, stock control clerk, and through business office routine and in every merchandising division. He bought for and managed various departments including one of the seven largest, the ready-to-wear. From 1933 through 1936 he had charge of the store's New York office and supervision of all buying operations. In 1936 he returned to Atlanta to become the store's General Sales Manager.

IN this automotive age, the private vehicle has become a necessity rather than a luxury. Increased distribution of automobiles and decentralization of our population to suburban areas create an acute traffic problem. It is the problem of downtown traffic congestion and the ability of business to take care of the physical mass of its customers.

In the face of this quandary, downtown property owners in every metropolitan city are concerned over the preservation of property values.

Of all these owners, the large retail merchant or department store operator probably has the greatest stake. For in addition to owning from ten to twenty million dollars' worth of real estate, most department stores are dependent on the movement of large masses

* EDITORS' NOTE: For several years now, *Rich's* in Atlanta has done more business than any other department store south of Philadelphia and east of the Mississippi River. Last year it grossed fifty million dollars.

Part of its secret is this, according to the *Saturday Evening Post* which called it "the store that married a city":[1] Rich's actually works at the policy that "the customer is always right." In 1949 the store exchanged, or refunded the full price on, six million dollars worth of merchandise, some of which it knew had been bought elsewhere.

No red-taped exchange department or time limit. One goes to a clerk, gets an exchange or refund—and usually remains to shop extensively. "You never have trouble at Rich's," one hears time and again in Atlanta. Good will and convenience pay.

A newer part of Rich's policy is the store's handling of customers' convenience in down-

[1] *SEP*, Dec. 3, '49, p. 34.

of people to maintain and improve their sales position in their respective communities.

Large retail stores, particularly in Los Angeles and New York, have run from this problem instead of facing it. They have evaded it by contributing toward the trend of decentralization through opening branch stores in suburban centers. This may alleviate some of the downtown congestion. But from the point of view of the merchant, it is often a mistake.

The function of a large department store—the reason for its being—is its ability to assemble under one roof vast selections of goods at many price points and in many categories, for the convenience of the public. Outlying units are, of necessity, limited in assortment and in the volume potential of sales. This detracts from the Main Store's traffic and helps to depreciate the store's progress and the value of its property. Perhaps, more importantly, these branch units diffuse the interest, time, attention, and talents of the Main Store's key personnel.

Instead of Where It Isn't

At Rich's this problem must, we believe, be cured *where it is* instead of where it *isn't*. It behooves the management of large retail establishments in the center of town to take a leading interest in politics, in voluntary traffic improvement associations, and in whatever other areas of civic activity will assist in the development of limited-access highways in their communities: the breaking through of dead-end streets, the building of underpasses and overpasses, the development of better traffic codes and improved enforcement, and the broad

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town traffic congestion. Last August Rich's completed a half-million-dollar parking garage. It can handle 325 cars at a time—from 1200 to 1500 cars a day on a 24-hour basis. The five-story building of reinforced concrete and steel—108,000 square feet in area—has double driveways and ramps for fast service, a lounge and waiting room, coffee shop and restaurant, and a large check room to which without extra charge shoppers can send their packages from Rich's store. The garage is less than a block away. The rate is 35 cents for the first two hours and 5 cents for each additional half-hour, or $1 maximum for a day.

Rich's believes the answer to downtown traffic is not decentralization through suburban branches but "the efficiency of one-roof merchandising and store-provided off-street parking." It is part of customer-convenience: "You never have trouble at Rich's."

This article on the merchant's interest in downtown traffic congestion, Richard H. Rich, president of Rich's Incorporated, wrote at the Traffic Quarterly's invitation.

attack on the problem of improving the flow of people to and from the center of their cities.

In addition to this, whether done through public financing or privately (however done, it must be done), it is the obligation of the managers of large enterprises to provide adequate and comfortable off-street parking facilities, strategically spotted throughout the downtown section.

In many suburban sections, parking conditions are becoming as congested as in the downtown areas. Because of the more limited traffic potentials in these decentralized areas, large elaborate multi-story facilities cannot be supported. Therefore it is highly possible that retailers and other citizens and downtown property owners who attack this problem energetically—perhaps even overbuilding parking facilities in terms of present needs—will turn the tide from decentralization back to the center of our cities where the public can best be served with large assortments and broad services. This theory is against the trend in many communities. But at Rich's we are taking a leading part in both these areas.

Through the efforts of our mayor and other public-spirited officials, a large bond issue has been passed in our community and limited-access highways are now under construction. Largely through the influence of an unselfish and hardworking group of voluntary workers, the Greater Atlanta Traffic Improvement Association has been instrumental in increasing the number of downtown parking spaces by approximately 3,200 off-street parking areas during the year 1949. City officials have been working on the problem and have been most cooperative in getting behind the recommendations of the Improvement Association and seeing that they were acted upon promptly. They deserve great credit for the assistance and interest shown the Association in its efforts to improve the parking and traffic problem of the city.

In solving this problem, it must be realized—and it is realized here in Atlanta—that with the growth of the community and a continued high plateau of prosperity, this problem will never be completely solved—that it is not static, and that one must move rapidly to merely remain abreast of the growing need.

Atlanta has recently added to its staff a full-time Traffic Engineer,

who is attacking this problem vigorously. It is planned that the rerouting of one-way streets within our existing facilities can speed up the flow of traffic and make it more pleasant and more comfortable for people to come to the heart of our city.

We realize that many people have moved farther and farther from the center of the city and that the suburban shopping center has its place. It is merely our ambition to keep it in focus by taking an aggressive and positive attitude in fighting it as we would any other reasonable and legitimate competition.

The best defense is a good offense, and it is our hope that on a continuing basis over the years this threat to downtown property values will be a blessing in disguise. It will bestir our best and most potent citizenry to act for the improvement of our city as no other single incentive could. The result will not merely be profitable and beneficial to selfish interests involved but will benefit the entire population in the long run.

Baltimore's One-way Streets

CHARLES J. MURPHY

Mr. Murphy has been City Traffic Engineer of Baltimore, Maryland, since March 1947. Previously he had worked in private industry. From September 1947 to June 1948 he attended the Bureau of Highway Traffic at Yale University.

CONTINUOUS studies of the operation of one-way arterial streets in Baltimore disclose two important facts:

1. One-way streets can carry traffic at reasonably the same volume RATE as an expressway.
2. A one-way street system consisting of many pairs of intersecting streets can be designed to carry traffic on ALL streets in the network at reasonably close to the same volume RATE as an expressway.

Referring to point one, if the necessary conditions are fulfilled on arterial one-way streets, a traffic volume of 650 cars per lane per hour can be attained. In Baltimore 650 cars per lane per hour have been counted during the peak hour on one-way streets under the following conditions:

Width: 39'—Four lanes
Parking: No parking, loading or unloading.[1]
Transit Load: Bus operation—1.4% total volume
Truck Load: 2% total volume (dual wheel units)
Length: 3.5 miles
Avg. Speed: 23 m.p.h.
Avg. Delay: One per mile
Grade: Avg. 2.5% up
Time: Evening peak—5 P.M. to 6 P.M.

A volume of 650 cars per lane per hour compares favorably with the generally accepted capacity of an expressway which is 1500 cars per lane per hour. The comparison is more favorable than is immediately apparent because, of course, the one-way street has all inter-

[1] —No stopping except to pick up passengers.

sections at grade, and time must be provided for cross traffic to flow. In this particular case, for example, only 50% of the green time[2] was assigned to the one-way street. This means, since only half the cycle was available to traffic on the one-way street, that the volume RATE was 650 x 2, or 1300 cars per lane per hour. This is fairly close to the expressway capacity of 1500 cars per lane per hour. This comparison gives only a measure of the efficiency of operation attainable on a one-way street, and does not, of course, change the fact that a one-way street lane has roughly only one-half the capacity of an expressway lane.

Referring to point two, the impressive fact about one-way street operation concerns Figure 1, which shows a network of one-way streets. It would be possible to carry much higher volumes than reported above on any single street in this network simply by assigning more of the green time to that particular street and by disregarding the requirements of traffic on the cross streets in the network. As in many cities where both north-south and east-west traffic is heavy, in Baltimore this would be impractical. Traffic from the north and south was found to be just as heavy as from the east and west, and a compromise had to be worked out to provide about the same facility of flow in each direction.

The significant fact is that peak volumes of 650 cars per lane per hour have been attained not on any particular one-way street in the network at the sacrifice of the other streets, but have been attained *simultaneously* on as many as three *intersecting* streets in the network. An extensive one-way street system made possible the development of a signal timing plan which provided a 25 m.p.h. progression with a pass band tapering from 30 seconds to 33 seconds on each of the eight important one-way arteries. The time-space diagram shown in Figure 2 is reasonably close to the time-space diagram for each of the eight arterial one-way streets.

Development

As long as 20 years ago, one-way streets were proposed in Baltimore as a way of improving traffic conditions. There were many obstacles

[2] — 60-second cycle.

to the one-way street plan at that time. Merchants and the public were not favorable to one-way streets, and the transit system was almost exclusively fixed-wheel operating two-way on many of the streets suggested for one-way operation.

It was not until 1939 that Franklin and Mulberry Streets were

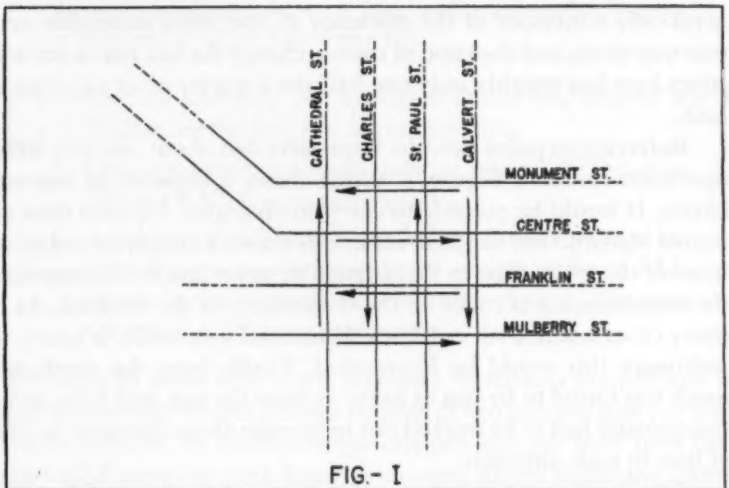


FIG.- I

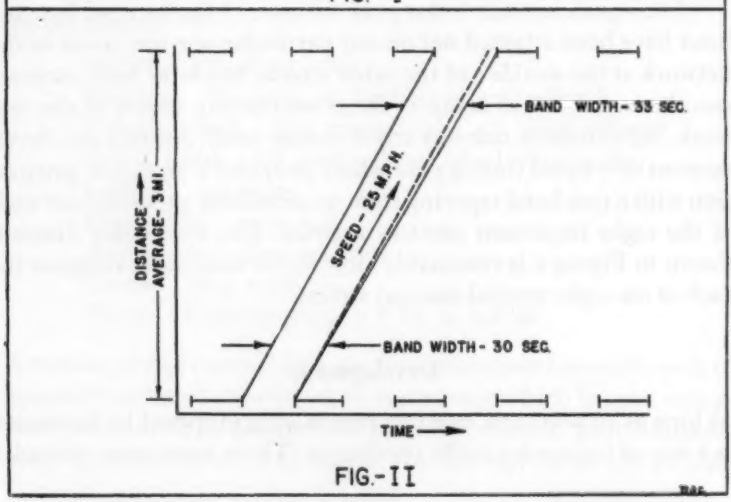


FIG.- II

made one-way, connecting the Central Business District with the western end of the city. Together with Orleans Street in East Baltimore, these two streets were designated U.S. Route 40. Franklin and Mulberry Streets did a wonderful job of selling the public the idea that here was a way to provide fairly continuous traffic movement without serious delay and without the enormous cost of new highway structures. The one-way street system, of course, is ideal for timing traffic signals, and the progressive system on one-way streets has a great deal of appeal to the driving public.

The question of street-car operation on many of the other streets in the city delayed the extension of the plan until sometime after 1939, when a plan was developed to convert many of the street-car lines to bus operation. Finally, in June, 1947 Calvert and St. Paul Streets were made one-way streets, serving the north end of town.

Prior to this time, people living in North Baltimore wanting to go downtown, could expect to travel at an average speed of 10 to 12 m.p.h. with an average of 8 to 11 stops. To be able to travel on Calvert Street from University Parkway to Redwood Street, a distance of 33 blocks, without a single stop, was a new and delightful experience. From that time on, while local opposition developed to each new stage of the plan, the public in general favored the one-way street system.

In one instance the objectors to one phase of the plan went to the courts for relief and requested that the city be enjoined from carrying out the provisions of an ordinance making two streets one-way. The objectors lost the case both in the lower Courts and in the Court of Appeals, and it is interesting to note that the higher Court held:

> ". . . . In any event, notwithstanding testimony as to hazards to pedestrians, we cannot escape opposing testimony, and the obvious fact, that on a one-way street the pedestrian's chance of survival is increased by decreasing the number of directions from which danger is to be expected. . . ."

Baltimore's one-way street plan is not yet completed. The existing system is shown on Figures 3 and 4. The addition of a pair of east-west streets at the south end of the Central Business District, and the addition of a pair of north-south streets to the west of the

Central Business District will considerably improve the operation of the entire system, and will complete a Surface Belt Highway around the Central Business District which is urgently needed until expressway structures have been authorized and built.

In the discussions before the City Council, as each ordinance

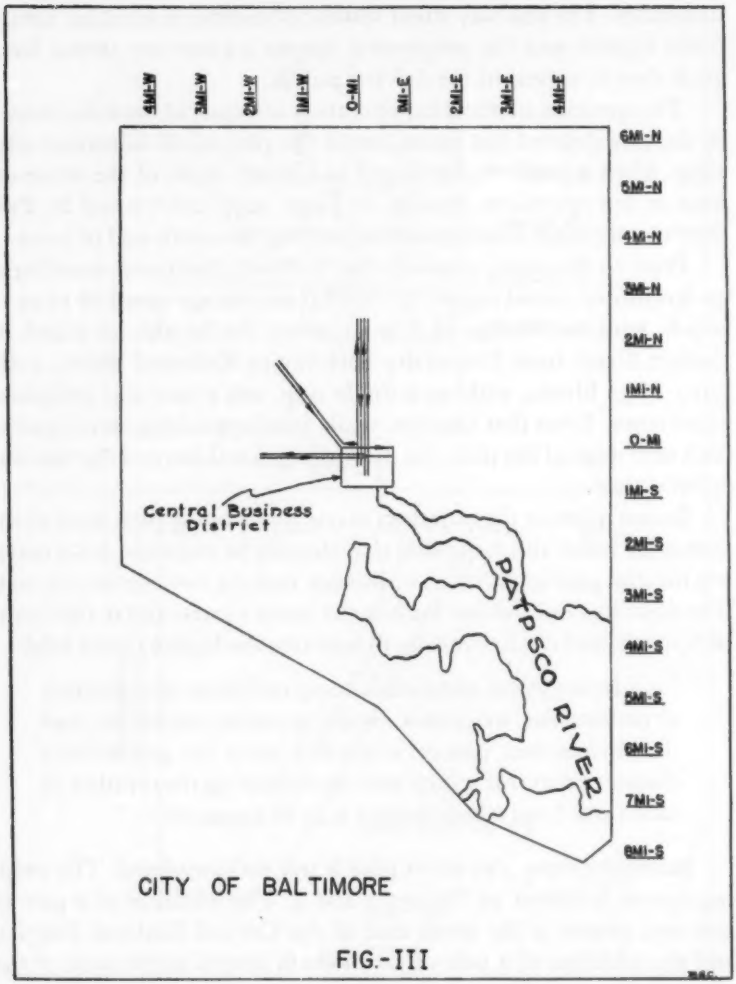


FIG.-III

authorizing another pair of one-way streets was discussed, it was evident that many of the important points could neither be supported or denied by indisputable facts. There was the question of the effect on business of making a one-way street away from the Central Business District; the effect on abutting property values; the

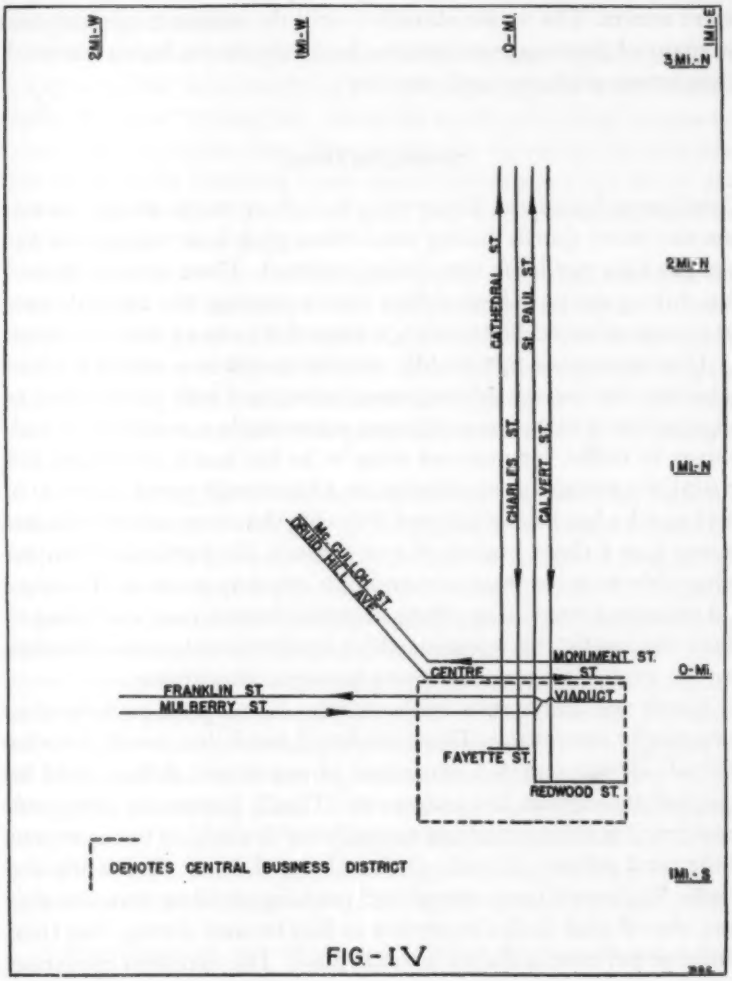


FIG. - IV

effect on transit operation, and many other questions concerning which factual data were meager. Some of them cannot even today be answered on a quantitative basis. But there seems to be a strong presumption that these questions have been resolved in favor of the one-way streets simply because the people of the city through their City Councilmen have continued to accept additions to the one-way street system. The major obstacle is still the existence of street-cars on many of the important streets. As street-cars are being removed, these streets are being made one-way.

Speed and Delay

Continuous Speed and Delay runs have been made on the present one-way street system during times when peak hour volumes of 650 cars per lane per hour were being counted. These studies showed that during the peak hour delays were averaging one per mile over an average distance of 3½ miles, at a speed of 22 to 24 miles per hour.

Our experience with public reaction to one-way streets leads us to believe the average driver is more concerned with the number of stops he has to make than with any other single consideration with respect to traffic. He does not seem to be too much concerned if a trip takes 9 minutes or 11 minutes, or if his average speed is 22 m.p.h. or 28 m.p.h.; but he is concerned if during the course of travel he has to stop 5 or 6 times instead of 2 or 3 times. He particularly enjoys being able to drive from one end of a one-way street to the other end without a single stop. Since as public servants we are trying to please the public, this question which involves a state of mind rather than an engineering measurement has some importance.

Speed and Delay runs made during the off-peak periods were particularly interesting. These studies showed that on all 8 major arterial one-way streets a maximum of one to two delays could be expected throughout the entire run. This is important when one considers that a one-way street normally carries only 10 to 12 per cent of the total volume of traffic during the peak hour. And while the Traffic Engineer's most critical and pressing problem comes at this time, the off-peak is also important to him because during that time almost 90 per cent of the travel takes place. The excellent operation

of one-way streets during the off-peak periods is certainly a strong point in their favor.

Signal Timing

The one-way street in itself is *not* necessarily an efficient traffic artery. It becomes an efficient artery only when controlled by a properly designed signal system.

If we consider a single one-way street without signal control, it is apparent that there would be a wide range of speed values and the traffic would be "strung out" along the street, providing no gaps for cross traffic or pedestrians. The progressive signal system improves this situation by imposing some speed control along the artery and also by bunching traffic in compact platoons, providing gaps for pedestrians and cross traffic.

The true importance of the signal system is not realized, however, until a network of one-way streets, such as shown in Figure 1, is considered. In this network the attainment of the high volumes of traffic with a minimum of delays on *each* street depends upon developing a signal timing plan which alternates the right-of-way at each intersection in such a way that the progression on none of the streets is disturbed.

In developing a one-way street plan, such as shown in Figure 1, it cannot be assumed that the traffic signals can be timed to coincide with the direction of travel selected for each street, and it could easily happen that after putting in the signal timing plan for St. Paul and Calvert Streets, and for Franklin and Mulberry Streets, giving the desired progression on these arteries, the traffic signals on Centre Street *cannot* be made to give the desired progression without disturbing the timing plan on Calvert and St. Paul Streets. This difficulty can be met by developing the entire signal timing plan in advance, and after discovering such a discrepancy, making minor changes in the timing plans of all streets to work out an acceptable compromise.[3] One of the exceptional advantages of one-way streets is that they considerably simplify the signal timing problem posed by networks similar to those shown in Figure 1, and therefore greatly

[3]—Proceedings—I.T.E. 1948 "Development of Timing Plan for a Network of Signal Systems."

improve the possibility of providing progressions on all important arteries in the network *simultaneously* at acceptable speeds with adequate pass band widths.

Control of Traffic Speed and Volume

In carrying out Baltimore's one-way street program a particular problem arose in one instance which was alleviated by adjustments to the signal system. The one-way street in question was a one-way southbound street which brought traffic from the northwest end of town into the downtown area.

Since the one-way street plan was not completed, some delay and congestion occurred at the fringe of the downtown area when the first heavy cross street was encountered. The one-way street was simply bringing traffic downtown too quickly and in volumes larger than the downtown streets could handle efficiently. This situation existed because at each signalized intersection along the one-way street full advantage was taken of available green time and the splits were actually determined on the basis of relative volumes at each intersection.

A moment's reflection showed that this was bound to cause a bottleneck at the first heavy artery crossing the one-way street. The situation was appreciably relieved by reducing the green time at each intersection in advance of the heavy cross artery, and making the pass band increase gradually in the direction of increasing traffic volumes on the one-way street. Ideally the pass band should be similar to the shape of the volume characteristic on the one-way street.

Therefore, we found it advantageous to strive for a properly shaped pass band rather than take advantage of the available green time at each signalized intersection. This has the effect of separating the points of delay. That is to say, a driver may be required to stop somewhere in the beginning of his trip and somewhere near the end, instead of sitting through two or three light changes at the first heavy cross artery he meets.

Essentially the problem on one-way streets is to design the pass band in such a way that the block entered by an oncoming platoon

is always clear except for a few vehicles that have turned into the street.

If it is found that the one-way street is bringing too many vehicles too quickly into the downtown area, the pass band width can be reduced uniformly throughout the length of the street and the signals may be timed to give a slower speed. Again this is bound to impose delays somewhere along the route but it will in many cases prevent a concentration of delays at one particular point in the system.

Before and After Studies

Without giving detailed statistics, before and after studies show that in Baltimore making a street one-way results in an average of 100 per cent increase in traffic volumes, a 75 to 90 per cent reduction in delays, and a 10 to 15 per cent reduction in accidents. In making these studies we are not measuring the effect of one-way operation alone, but also the effect of imposing additional parking restrictions, installing additional traffic signals, substituting bus operation for street-cars, and other minor changes associated with conversion to one-way operation. However, the one-way streets considerably increase the benefits derived from these secondary measures.

Conclusion

Where does the one-way street fit into the traffic plan of urban areas?

There has been a radical change in the thinking connected with this question. Many years ago, only narrow alleys were considered fit candidates for one-way operation. It was thought to be a waste to make wide streets one-way and it was only after an adequate selling job had been done that one-way streets came into their own as major traffic facilities. Now there are murmurings that perhaps too much emphasis is being placed on one-way streets; that they are being considered falsely as a cure-all. The answer to the question lies between the two extremes. They should not be used exclusively to relieve conditions in 12-foot alleys, nor should they be thought of as a permanent solution to the traffic problem. Up to this point the very nature of the traffic problem has proved to be such that no improvement,

including expressways, can be considered a permanent solution. This condition will probably exist as long as the social, economic and political factors prevail that are reflected in the steadily increased use of the automobile. Expressways are now being built to relieve overloaded surface street systems, and in the very near future expressways will have to be built to relieve overloaded expressways, if this is not the case already.

The one-way street is merely one phase in the progressive treatment of the urban traffic problem. The phrase, "make best use of existing facilities," is slightly worn from constant use, but it aptly describes the situation regarding one-way streets. Usually a street can be made one-way at no more expense than that of installing a few signals and signs. In return for this nominal outlay, the city has a traffic facility capable of carrying twice the traffic with an appreciable reduction in delays and with a lower accident rate. An excellent case can be made for the argument that dollar for dollar a properly designed one-way street system gives the taxpayer greater return for his money than any single traffic improvement. Where possible, therefore, one-way streets should be employed with the knowledge that they can give relief cheaply and quickly, but with full realization that if the present trend in automobile usage is continued, they can provide only temporary relief and that new roadways will have to be built to keep pace with increased traffic demands.

A Plan for Off-Street Parking

SIDNEY ANGER

Mr. Anger has been Traffic Engineer of Lansing, Michigan since 1935. Previously he had been an Assistant to the Maintenance Engineer of the Michigan State Highway Department since 1922. He has served as a member of the Parking Study Committee and on the committee which made an origin-destination study for Lansing as well as a transportation study during World War II. He is a member of the Institute of Traffic Engineers, the National Safety Council and the International Municipal Signal Association.

EVERYBODY knows about the parking problem but the important thing is how to solve it. Here are facts behind the dilemma:

There are enough motor vehicles in the United States to permit our entire population to ride at one time. Forty-one million vehicles are registered, six million more than in 1941. There are more automobiles per unit population in the city than in the country. This condition has made the parking problem a billion-dollar blight on business. Enormous investments in central business districts are threatened by lack of adequate parking accommodations. An urban traffic increase of from 40 per cent to 60 per cent in the next five years is indicated by all available studies by cities and highway departments. As the parking-increase parallels the traffic-increase, we have used the conservative 40 per cent in the analysis of our future parking needs.

City planners, traffic engineers, and police executives throughout the country agree that within the next few years, assuming the traffic will continue to increase, most parking will be prohibited on arterial and business streets in all our cities. This trend has been apparent in a majority of all communities having a population of 50,000 or over.

Lansing Parking Study Survey

Knowledge of these facts early in 1946 interested the city officials of Lansing enough to plan for adequate off-street parking facilities in

the central business district as soon as possible, to assure the future prosperity of the city and discourage costly decentralization of our major business district. City officials believed that the development of such a program was a joint responsibility of the City Planning Commission and the City Traffic Commission. As a result the engineers heading these two departments suggested that a committee, known as the Parking Study Committee, be formed for the purpose of making a survey of off-street parking needs and recommending a parking plan for the central business district.

It might be well at this time to point out that both the City Planning Commission and the City Traffic Commission were created by City Ordinance. The City Planning Commission consists of the mayor, an administrative officer selected by the mayor, a member of the city council selected by that body, and six other citizens. The City Traffic Commission consists of seven members, one of whom is a member of the city council, one the Captain of the Traffic Division of the Police Department and five other citizens. Both commissions act only in an advisory capacity to the city council and have no authority for setting up any regulations on their own.

The Parking Study Committee of eight members—the City Traffic Engineer, the City Planning Engineer, a member of each of the two commissions and four executives representing the larger mercantile establishments in the city—was directed by the city council to make a complete study of the parking situation and to recommend to the city council locations for off-street parking areas. The committee began by making an analysis of existing off-street parking facilities in the central business district, and of our future needs. Any plan adopted as a result of the committee's study should provide for the needs of the city twenty-five years from now. The committee, having set up the boundary area to be known as the Central Business District, found that the following present parking facilities existed: (Figure 1)

Off-Street	(25 Lots and 3 Buildings)	2,264 Spaces
Curb Parking	(Metered)	930 Spaces
Curb Parking	(Time Limited)	968 Spaces
	Total Parking Facilities	4,162 Spaces

We were fortunate in that the Michigan State Highway Depart-

ment had recently completed an Origin-Destination Study of Lansing which indicated a need for 5,301 parking spaces on a normal business day. Peak day-time parking would require an additional 15 per cent of the normal day-time parking or 795 additional spaces making the total peak day-time requirements 6,096 spaces. By adding an anticipated increase of 40 per cent for future requirements, we

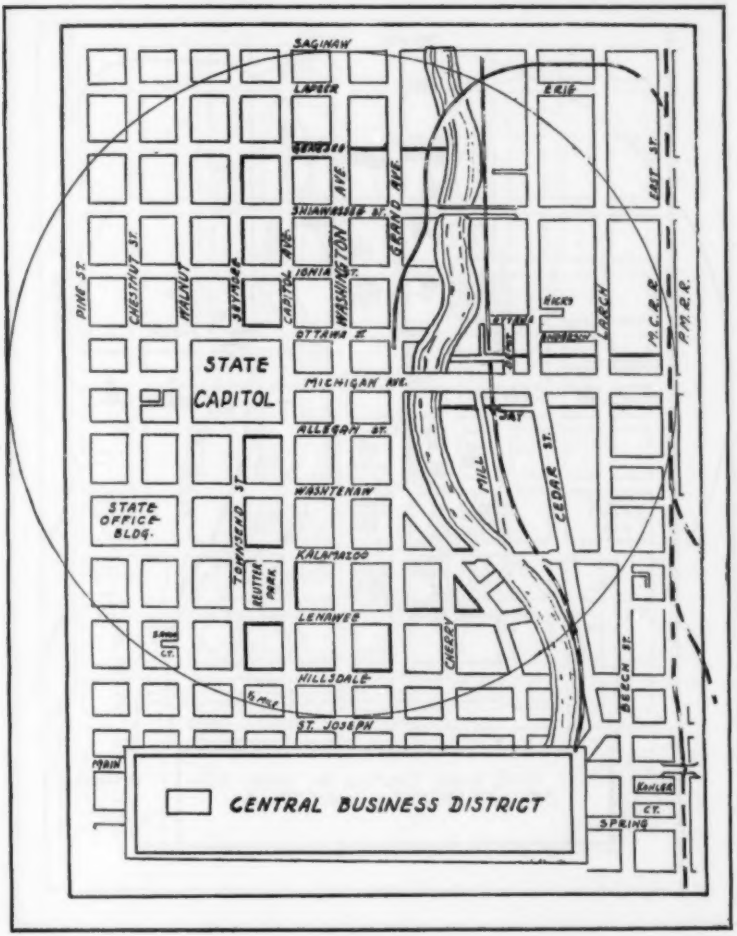


FIGURE 1

arrive at the need for an additional 2,438 spaces which in the future would bring our total requirements for peak day-periods to 8,534 spaces.

It can safely be assumed that some of the property used for privately owned parking lots will be converted to building sites, while future curb parking would probably not be 25 per cent of the present

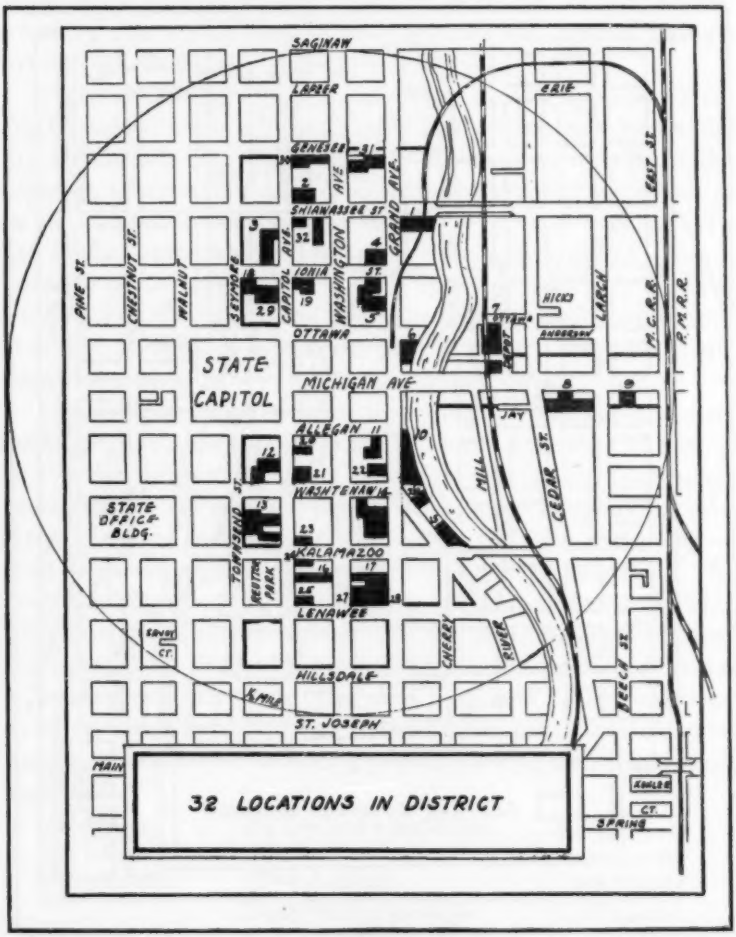


FIGURE 2

available spaces. This computation results therefore in a total of 890 spaces available for parking, leaving a future deficit of 7,644. The problem then is how best to provide space to take up this deficit. Certainly we must establish our parking plan on public land where its future will be assured and further, the off-street parking facilities must be properly located within the district to be served.

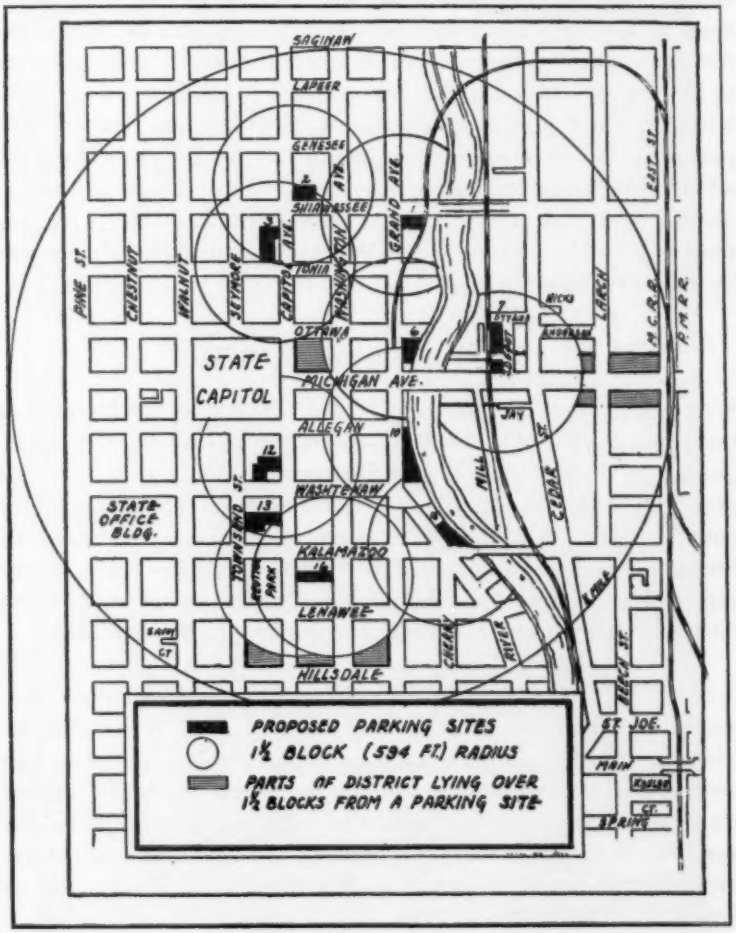


FIGURE 3

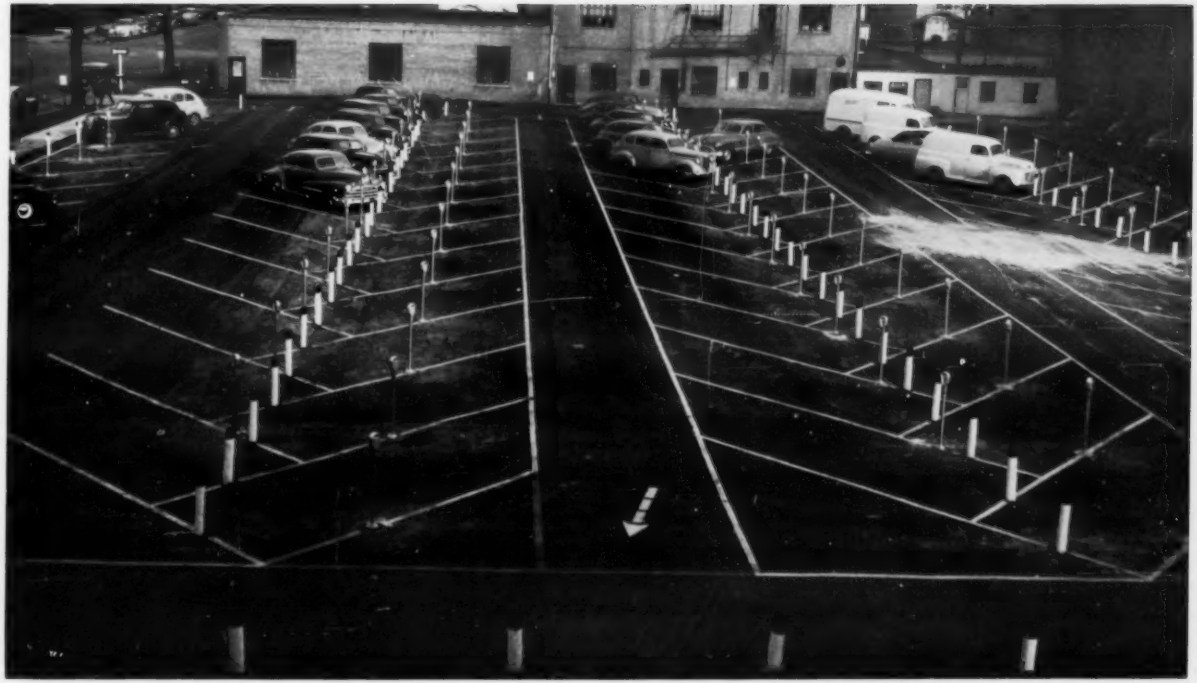
Ten Sites for Parking Lots

A survey of the Central Business District revealed thirty-two locations of sufficient size, as shown in Figure 2, to be used for parking. All these locations were either vacant or occupied by low cost buildings which were pretty well amortized, making it economically possible to use them for this purpose. The committee then chose ten of these sites, as shown in Figure 3, selecting them as to location in the district, parking capacity and traffic distribution. These sites were so located that practically all the property in the district would be within one and one-half blocks (594 ft.) of at least one of them. The potential capacity of the ten lots would aid greatly in absorbing the additional amount of parking space required in the central business district. This plan of ten designated locations for off-street parking was submitted to our city council in December of 1946 and approved by them in January of 1947.

Developing the Parking Plans

We turn now from the planning stage to the actual development of the original plan. At this writing, five of the locations have been acquired, developed and placed into service for public use. All property purchased, plus the cost of development, has been paid for out of funds accumulated from curb parking meter revenue. All future revenue from off-street and curb parking sources is earmarked for the off-street parking reserve fund to continue acquiring the remaining properties in order to complete the original plan.

Of the five lots now in operation, three use parking meters while in the other two, parking is handled by attendants. This last arrangement is only temporary as the Traffic Engineering Department intends to control all off-street parking on our municipal lots through parking meters. The three lots on which meters have been installed are locations 7, 3 and 13 as shown in Figure 3. The lot leased for operation at the present time is number 10 and the unmetered lot, with free parking, is number 15 on this same sketch. The capacity of these lots is as follows:



Parking Lot No. 1 (Location #13 on Fig. 3)

LEGAL PARKING
24 HOUR METERED PARKING
2 HOURS - 1 NICKEL
4 HOURS - 2 NICKELS
6 HOURS - 3 NICKELS
8 HOURS - 4 NICKELS
10 HOURS - 5 NICKELS OR 1 QUARTER
12 HOURS - 6 NICKELS
SUNDAYS AND LEGAL HOLIDAYS EXCEPTED

Photograph of Meter Used on All Parking Lots

MUNICIPAL PARKING LOT - Nº 2
METERED PARKING
24 HOURS PER DAY
EXCEPT SUNDAYS AND LEGAL HOLIDAYS
USE METER ON LEFT SIDE OF CAR
PARKING RATES SHOWN ON METER.

Standard Type Information Sign Used on Each Lot

Lot	*Capacity*
Number 3	93 vehicles
Number 7	116 vehicles
Number 10	175 vehicles
Number 13	105 vehicles
Number 15	45 vehicles

The meter which we have standardized for our lots is of the automatic type and provides two-hour parking for 5¢ up to twelve-hour parking for 30¢. The meter will take one to six nickels or a quarter and one nickel. In preparing our specifications for the parking meters, we required that the unexpired time would not be shown. This is a rather radical departure from the usual type of curb parking meters which always indicates the unexpired time remaining. Revenue from these meters increases somewhat, as the parker pays for the actual time he desires to use the space and does not receive, at least to his knowledge, the benefit of the unexpired time left by the previous parker. The meters operate 24 hours a day except that no charge is made for Sundays and legal holidays. (See picture of parking lot meter.)

With the low cost of five cents for two-hour parking, it was feared that the private-lot operators would object to the city officials' operation of off-street parking lots. The average charge for parking on privately owned lots is 25¢ to 35¢ for the first two hours and 5¢ for each additional hour. The average charge for all night parking from 9:00 p.m. to 8:00 a.m. is 60 cents. This complaint failed to materialize, however, since the extreme shortage of parking facilities still creates enough demand for parking to fill to capacity the privately owned and the municipally owned parking lots. It is safe to assume that this condition will continue for quite a number of years to come.

It might be well at this point to compare the average annual return of the curb parking meters with that of the off-street parking meters. In 1949, the average yearly return for each curb parking meter was $101.00 while the return for the off-street parking lot meter was $65.00. On spot checks we have made, the average turnover on the curb meter is ten cars a day while the turnover on the off-street parking lot meter would not exceed three cars a day for

each space. This turnover ratio, therefore, accounts for the difference in revenue for the two types of meters.

Lots Paved and Lighted

The lots developed so far all have blacktopped surfaces with each parking stall definitely laid out and arranged in a herring-bone pattern. (Parking Lot No. 1) Traffic comes into the lot on one street and exits on a parallel street or enters and leaves by separate drives, thereby eliminating any congestion occasioned by traffic entering and leaving from one street or driveway. The Traffic Commission, endeavoring to promote greater use of the lots during hours of darkness, has installed adequate flood lighting to encourage the use of the lots at night. The following is a table giving the amount of lighting on the three metered lots:

No.	*Watts*	*Bulb Type*	*Lumens*	*Total Lumens*	*Approx. Area*	*Lumens Per Sq. Ft.*	*Watts Per Sq. Ft.*
			PARKING LOT NO. 1 (198′ x 165′)				
2	750W	PS–52 Clear	15,500	31,000	32670 Sq. Ft.	.949	45.9
			PARKING LOT NO. 2 (299′ x 87′)				
3	450W	PS–40 Mult. St. Lt.	6,000	18,000	26013 Sq. Ft.	.692	46.7
			PARKING LOT NO. 3 (186′ x 110′ & 185′ x145′)				
2	1000W	PS–52 Clear	21,500	43,000	47285 Sq. Ft.	.909	42.3

Since the parking lot meters are covered by ordinance the same as the curb parking meters, enforcement is handled by the parking detail of the Police Traffic Division. The night-time checking of the off-street parking lots is handled by the district police cruiser who makes a two-hour check of each individual lot. Some difficulty has been experienced in the Traffic Violations Bureau from parkers using the off-street facilities who received parking violation tickets especially after 6:00 P.M. They complain that they believed the

regulations for lot meters were the same as those for curb parking meters. It is our contention however that available parking at the curb is much more difficult to obtain in the evening because of no enforcement regulations and that a parker desiring space should be willing to pay the parking rates on the lot where space is more readily available than at the curb.

Cost of Off-Street Parking Lots

For the benefit of a municipality considering the development of off-street parking facilities, it might be of interest to have a picture of the cost of developing such a lot. The big expense of course would be the actual purchase price of the property which would vary in each community. The table on page 294 gives a complete cost record of the three metered lots developed to date:

In preparing a yearly budget for the maintenance of off-street parking lots, certain fixed charges must be borne in mind. These would normally consist of the following items:

Repainting of parking stalls which might be required only once a year.
Weekly flushing of lot by power flushers.
Removal of snow in winter and application of chloride during ice storms.
Property and equipment taxes.
Current for flood lighting.

In the construction of our first lot, we used 5" cedar posts for bumper posts. However, our experience indicated that while this was the cheapest material to use, it was not of a lasting quality because of the fact that cars hitting the wood posts loosened them and split them. On the other lots we constructed, we used 4-inch boiler tubing in 5-foot lengths for our bumper posts.

These were placed in concrete 26 inches below the parking lot surface and concrete was also poured in the inside of the pipe, thus making a very rigid installation which can take a lot of pushing without bending or otherwise being damaged. Our program this spring calls for the replacement of the wood posts on Lot No. 1 with 4 inch

CITY OF LANSING—TRAFFIC ENGINEERING DIVISION

METERED PARKING LOT COST DATA

	Municipal Lot No. 1 *300 Blk. Townsend St.*	*Municipal Lot No. 2* *300 Blk. N. Capitol*	*Municipal Lot. No. 3* *400 Blk. E. Michigan*
Size of Property	198′ x 165′	87′ x 299′	2 Pcs. Approx. 110′ x 186′ " 145′ x 185′
Capacity	105 Cars	93 Cars	116 Cars
Completion Date	12/17/48	9/7/49	11/10/49
Cost Per Car Space (Less Property Cost)	$ 169.34	$167.50	$112.55
Cost Per Car Space (Including Property Cost)	$1015.32	$896.95	———
Cost of Property	$ 88,825.00	$67,839.25	Leased
Grading, gravelling & base preparation	4,849.72	5,539.11	$ 1,229.04
Black-Topping	3,737.19	2,690.24	3,466.48
Cost of Parking Meters	6,930.00	6,138.00	7,250.00
Bumper Posts	81.25 (Wood)	120.00 (Iron Pipe)	195.40 (Iron Pipe)
Installation of Meters & Bumper Posts	918.34	576.26	480.52
Paint for Posts & Parking Lanes (Material Only)	44.10	50.70	69.20
Regulatory Signs	136.50	100.00	175.73
Flood-lighting	946.40	272.19	154.88
Topping & removing trees	63.10	65.90	———
Fencing	52.04	———	———
Plans	25.00	25.00	35.00
Total Construction Cost (Less Property Cost)	$ 17,783.64	$15,577.40	$13,056.25
Total Construction Cost (With Property Cost)	$106,608.64	$83,416.65	$13,056.25

boiler tubing which will conform with our now standarized installation. A recent booklet entitled *Off-Street Parking,* issued by the Transportation and Communication Department of the Chamber of Commerce of the United States, indicates clearly the action taken by private enterprise in providing parking facilities for their shoppers in order to protect their tremendous investments in the buildings which they occupy as well as maintain pleasant customer relations. The issue of whose responsibility it might be to provide parking facilities for all those individuals desiring parking spaces is debatable but it is my personal opinion that the municipality has as much at stake in providing parking facilities in the central business area as does the merchant, because when decentralization sets in property values fall and tax revenues decrease.

Development of the parking lot is only the first step in the solution of the problem. If motor vehicle registrations continue to increase the demand for parking space will increase and the next step will be the construction of parking buildings on the area formerly used for surface parking only. Municipalities should definitely earmark all revenue received from curb or off-street parking sources to a separate fund for developing not only off-street parking lots but also ultimately constructing parking garages. This can also be financed by revenue bonds but when the average citizen realizes that the money he places in the parking meters is entirely used for his benefit to provide additional parking facilities, he will feel that his community is actually working in his interest. It must be remembered that a solution to the local parking problem has been, and will continue to be made only by the collective action of the governmental officials, merchants and property owners.

"The Case for Speed Zoning[1]"

TAYLOR D. LEWIS

Mr. Lewis, now Associate Professor of Civil Engineering at Cornell University, Ithaca, New York, began the study which resulted in this article while on the Research Staff of the Yale Bureau of Highway Traffic. Professor Lewis has had varied and extensive experience in transportation: He has been a Traffic Engineer for the United States Army, a Traffic Engineer of two cities, a Safety Engineer for an insurance company, and a Highway Engineer for a state.

MODERN highways of only yesterday are now generally considered obsolete in terms of present thought on highway design. The highways we have, however, represent public investment and cannot easily be discarded. Highway custodians could not *duplicate* these "obsolete" structures at twice or three times the original cost, much less produce an overall improved highway mileage at that figure. And in years to come, our small mileage now considered "up to the minute" in highway design will also prove lacking in the light of future development. Intelligent speed zoning has helped to bridge this gap between the outmoded highway and eventual replacement.

Unrestricted operation of motor vehicles is one of the broad goals toward which the progressive highway designer works. The designer is of course handicapped in his efforts by economy considerations. Unrestricted operation would mean that the factor of "speed" would be restricted only by the capabilities of the driver.

In no case, under these conditions, could speed be listed as an involvement in either accidents or congestion. "Unrestricted" does not mean that motor vehicle operators would be allowed to go "hog-wild" but that *safe and easy* driving would be *correct* driving. In other words, the driver's desires and actions are moulded by the highway.

[1] Information on Speed Zoning methods as practiced by forty-seven of the forty-eight states has been consolidated. Such an excellent response to the inquiry (98%) is in itself an indication of widespread and genuine interest.

Speed Zoning as a Necessary Control

Since we do not have a great mileage of super-design highways, and since most of the vehicle miles of travel in this country are on our less satisfactory highways, inherited from the past, some control of the "speed-factor" must be evolved.[2] Just as maintenance work is performed in order that the surface and the shoulders of the highway are kept in safe and usable condition, so too must operational maintenance be provided.

Speed control, both from the standpoint of excess speed and of insufficient speed (or delay) must be considered as part of this operational maintenance.

Speed control for excess speed is chiefly necessary because of accidents. Accidents with an excess speed involvement are climaxed in running off the road or in collisions with other vehicles or objects. This first type of accident results from the development of too much centrifugal force. The second type comes from inadequate stopping distance due to excess speed for the available sight distance.

Excess speed has two other unfortunate aspects. First and most serious is the fact that collisions are more severe at higher speeds. What would have been a simple property damage accident at a slow speed often becomes more extensive damage, injury, or a fatal accident at a higher speed. Excessive speed also causes the mental unrest prevalent among citizens in small towns or on the fringe of larger cities where drivers enter urban areas at unsafe speeds. They have been driving in rural areas where high speeds can be maintained for long periods and they lose their speed-consciousness. They tend to consider a small reduction in speed as safe, but the accident experience habitually points out this error in speed judgment.

Irritation resulting in chance-taking and attempts at foolish passing, is the result of large differences in vehicular speeds of individual vehicles. Speed zoning tends to group speeds into more reasonable and narrower ranges, increasing the unreasonably low speeds and thus decreasing passing and attempts to pass. This reduction

[2] The extent of Speed Zoning as now practiced among the states can be shown by the following: Fifteen states (32%) of those with authority do considerable Speed Zoning; nineteen states (40%) do some Speed Zoning; and thirteen states (28%) do little or none.

in passing and attempts to pass reduces sideswipes and head-on collisions.

Speed Zoning Forms

Speed zoning may take several forms; the most common is the posting of legal speeds as determined by land-use or political boundaries. These blanket speed-restrictions are ordinarily set up by either state or municipal legislation, and although they are usually safe speeds they are not uniformly reasonable speeds wherever applied.

In contrast to the blanket type of speed restriction there is spot-speed zoning that provides for the posting of safe and reasonable speeds at "independent" hazard locations. These speeds may or may not be suited to the hazards found at the individual locations, depending on the thoroughness of the engineering and traffic study made to determine the posted speed, or the absence of such a study.

The third type of speed zoning, the type universally conceded to be the most practical, is the posting of speed restrictions of convenient duration or length to the motorist, based on complete and thorough engineering and traffic investigations. With this type of zoning the motorist is informed of the safe speed for all hazards enroute and is also allowed to travel at reasonable speeds.

The legal area limits in this type of speed zoning may be either raised or lowered to fit actual conditions into reasonable length zones of uniform speed in order that the motorist may operate his vehicle without constant or rapid acceleration or deceleration. Continual speed change is distasteful to motorists in addition to the fact that mental and physical inertia plays a part in sustained speeds beyond the safety point. Any reference to speed zoning from this point on in this paper should be considered to be of this third type of speed zoning.

For years the uniform vehicle code (Act V, Sect. 57) has contained a section dealing with the legal right or duty of the State Highway Commission[3] to fix speeds for day and night operation of motor

[3] State Highway Departments in twenty-eight (67%) of the states reported as doing Speed Zoning, have either final authority, partial authority, or are responsible for Speed Zoning studies and recommendations. Seven other departments are mentioned but not in significant numbers.

vehicles, on any part of the highway system, based on an engineering and traffic investigation. A great number of states have adopted this suggested legislation either verbatim, identical in meaning, or in part. A review of speed zoning legislation of the various states reveals that the speed zoning programs would be improved and easier to operate if more states would adopt the suggested Speed Zoning provisions of the Model Code.

Area Limitations for Best Results

Speed zoning in its accepted sense is not really warranted or in fact truly possible in highly developed urban areas. In these areas, speeds are relatively low, the speed range within reasonable limits. Area or blanket speed restrictions coupled with the active enforcement possible in these congested areas cover the safety consideration in speed control. In addition, increases in vehicular density on our streets and highways and general awareness of hazards to be encountered in urban areas bring about their own speed reduction or restriction. Likewise delays or unreasonably slow speeds are changed by the weight of public opinion or alternate routes discovered.

Speed zoning may then be said to be most effective from the edges of dense urban development through the residential areas out into the rural areas.[4] Also it goes almost without saying that a route important enough to speed zone is important enough to protect from intersecting streets with stop signs or other traffic control devices.

Tolerance In Posting Speed Zones

Perhaps one major consideration, after the need for speed zoning has been determined, is the amount of tolerance to be allowed between the determined safe and reasonable speed, the posted speed and the enforced speed. The task of enforcing posted speeds is a difficult one if the public is not in agreement. The task is increased in

[4] State officials have kept their speed zoning activities almost entirely to rural State Highways. Of the states with authority, thirty-six (75%) have authority to speed zone rural state highways, twenty-eight (60%) have authority on both rural and urban state highways; and only ten states (21%) have authority to speed zone all streets and highways within the state.

difficulty if it becomes common knowledge that some leeway is allowed.

The old saw about giving an inch and taking a mile is normal practice among motorists. If you give a tolerance of five miles in order to try to make up for the five-mile tolerance allowed by the courts for public relations, the motorist soon learns of the practice and takes ten miles. The practice of tolerance brings two evils: the motorist learns to disregard all posted speeds, and by disregarding them often gets into serious trouble at hazard locations. Tolerance creates a chain of events that is difficult to handle; therefore it is simpler to post the safe and reasonable speed in the first place and have the speed zoning signs mean what they say. Public reaction as measured by many studies of "after" zoning have been uniformly favorable to this "no tolerance" posting of speeds. It must be understood, however, that a sufficient safety factor is applied in the determination of the safe and reasonable speed to take care of small violations which may result in discomfort but not a hazardous ride.

Normal Conditions

Speed zoning must be accomplished with normal conditions in mind. Normal conditions mean that the safe and reasonable speeds are determined for weather, traffic and other conditions that occur most frequently. Any change from the normal can be considered as requiring a reduction from the posted speed. In some states[5] weather conditions are such that two "normals" occur in a year and the speed zoning is figured for both normals and the signs are changed twice a year according to the climatic changes. The motor vehicle operator is not relieved of his responsibilities for safe operation by the occurrence of traffic or climatic changes from the normal. He is required at all times to exercise good judgment, and must understand that posted speeds are maximum for the best of usual conditions to be encountered, and that he must reduce speed whenever usual conditions change to conditions less favorable than the normal.

[5] Three states find they must make seasonal allowance for the normal by posting supplemental signs.

Legislative Action[6]

The model-code wording has been adopted as standard for laws authorizing state highway departments to do speed zoning. This authority varies, but there are three main divisions: states lacking authority to speed-zone and therefore do none; states without authority to speed-zone but who do some as a service to the public in an advisory capacity; and third, states authorized to speed-zone. These may be divided into two groups.

The first group speed-zones under their broad regulatory powers, and the second group under the specific speed-zoning legislation. Another legislative difference in speed zoning authority lies in the fact that some states are only permitted to lower the existing area limits, while others are permitted to raise area limits as well as lower them.[7]

No matter how speed zoning is accomplished, whether under broad regulatory powers, specific legislation or as advisory warnings only, enforcement of the posted speeds will be self-inflicted by the public if the posted speeds are recognizably safe and reasonable. The model law recognizes the need for both safe and reasonable speeds when it requires that the posted speed be determined by engineering and traffic studies.

Final Appearance

A speed-zoned route should present to the public a complete, dignified, authoritative, and obvious picture of the safe and reasonable speeds at which a motorist can travel over the route in question. The job must be complete for the motorist cannot be suddenly cast adrift on his own judgment after he has once been taken in hand by the speed zones. To leave gaps in the advice or, without warning to end advisory cautions, would result in destroying confidence in the zon-

[6] Twenty-seven (58%) of the reporting states base their speed zoning activities on specific legislative authority; eleven states (23%) use their broad regulatory powers as authority to speed zone; and the remaining nine states (19%) are without authority to speed zone. Four states without authority to speed zone do speed zoning as an advisory measure.

[7] In twenty states (43%) the speed zoning authority covers both raising and lowering the overall general area speed limits; sixteen additional states (making a total of thirty-six or 77%) can lower the speed limits.

ing as well as in creating confusion as to whether the gaps were intentional or simply oversights. This completeness requires posting of sufficient signs properly located so that the motorist is continually aware of the safe and reasonable speed, warned sufficiently *far* in advance of a required change in speed, frequently reassured, and relieved of the necessity for wildly looking around for the next sign.

The dignity of an installation is chiefly dependent on its standardization, simplicity and conservatism. Dignity is necessary in order that the public confidence is gained and retained in the installation. Odd shapes, sizes and colors create a haphazard impression, while standardization tends to create confidence.

Authority for a speed zone sign should show on the sign as nothing is more conducive to disregard of a restriction than an anonymous notice.

In recommending that the speed zoning be obvious there are two thoughts to consider. First and basic is the principle that speeds determined by the engineering and traffic study should be safe and reasonable. The second idea is more or less dependent on proper location, maintenance and illumination[8] of the signs. Day and night actual measured speeds seldom vary more than a mile or two an hour. Therefore, reflectorization or other illumination is not a problem of two signs but of the illumination of one. Exceptions to these are the area-speed restrictions by legislation or ordinance but which may be different for daylight and darkness. Proper location of signs can be tested by use: a person driving along the route must be able to see the signs without a conscious effort. Proper installation of signs in the field is a readily acquired skill with practice. Also there must be scheduled and frequent check to test the visibility of the installations. Part of this developed skill, mentioned above, is devoted to the placing of the signs so that they remain in place and are not damaged by traffic.

Maintenance of all traffic control devices, and not simply speed zone signs, must be planned and continuous. Observance of traffic restrictions is partly dependent on the appearance of the device giving notice of the restriction. A poorly maintained sign, (twisted,

[8] Thirty-four (83%) of the reporting states have reflectorized some or all of their speed zone signs. All of the states are planning or completing the reflectorization of these signs.

bent, illegible, rusty) appears unimportant to the authority responsible for its erection; therefore, frequently a motorist cannot be blamed for disregarding the message the device is supposed to convey.

Studies and Organization

Much has been said about engineering and traffic studies as the basis for speed zoning but little about the studies and organization necessary to accomplish the zoning. Only the most important or allowable minimum number of studies will be discussed here because most states lack the budget for any but essential work. When time and money are available, these studies should be augmented and expanded. Speed zoning by personal opinion is seldom if ever satisfactory; it invariably fails to produce reasonable speeds.[9]

A brief listing of essential engineering and traffic studies for speed zoning follows:

1. Condition diagram, strip map, or plan of the route
2. Accident study
3. Route log
4. Ball bank study
5. Floating car study
6. Sight distance study
7. Spot speed study
8. Transition zones

Condition Diagram, Strip Map, or Plan

A condition diagram or plan of the route to be speed-zoned is necessary to acquaint the planners with all the roadside culture, design features and general highway conditions that influence any determining of speed. These diagrams are often the original construction plans revised to date. When the construction plans are not available, it is necessary to prepare a rough sketch route-plan from field notes.

[9] In the majority of the reporting states (60%), personal opinion has no place in the determination of safe and reasonable speeds.

Elaborate diagrams are neither economically possible or necessary to an adequate job of speed zoning. A continuous strip film from airphoto is the best possible condition diagram because it shows in complete detail the actual conditions on a highway for a width of 500′ to 1000′. Some states have used these continuous strip films for maintenance, right of way, and performance studies. The cost is twenty-five to forty dollars a mile, depending on topography with a scale from one-inch-equals-one-hundred-feet to one-inch-equals-five-hundred-feet. The cost of such a film might not be warranted for a speed zoning study but that cost could be apportioned to other necessary studies in the state highway department.

On these plans will be plotted the data from the other studies for consideration of the project as a whole.

Accident Study[10]

Certain highway accidents have a definite speed involvement. The records should be searched for the route in question, for a period of from three to five years, or since major changes have been made in the route. As a result of that search, those accidents with a speed involvement should be plotted on the condition plan for further consideration in the final determination of the speed zones.

Route Log

A route log is a brief description of the route in question made to supplement the condition plan and to aid the planning of the other studies. An observer travels the length of the route (each direction taken as a separate unit) and notes all items or changes in condition that affect speed and speed zoning. These descriptions are keyed together by a mileage indication from some reference point usually the start of the project. Some observers have found a dictaphone is an improvement over hand or typewriter notes. Needless to say the observer should be familiar with the condition and accident studies before he attempts the log. The results of the log are posted on the condition plan.

[10] Thirty-six states use accident studies in their speed zoning.

Ball Bank Study[11]

A ball bank indicator is a curved tube in which a steel ball is free to roll, in oil, when acted upon by centrifugal force as the vehicle to which the indicator is attached goes around a horizontal curve. Safe and reasonable speeds are determined (taking into consideration the superelevation, coef. of friction of the surface, and amount of unevenness of the surface) by the reading, in degrees, of the indicator. For speeds in excess of 30 m.p.h. a 10-degree reading is the limit for a comfortable ride; 12 degrees for speeds between 20 and 30 m.p.h.; and 14 degrees for speeds below 20 m.p.h. The observer rides over the route at what he considers the highest safe speed and notes when the ball bank indicator reaches the maximum allowable readings. A recheck of those curves shown to be hazardous is made by either or all three of the following methods:

1. The observer operates around the curve at increasing speeds until he obtains the maximum allowable reading (of the speed range). He notes that speed and makes two or more additional trips to confirm his findings.

2. The observer operates around the curve a sufficient number of times (two or three) at the same speed so as to obtain a confirmed reading which he converts, by the use of the table found on page 199 of the *Traffic Engineer's Hand Book,* into a safe and reasonable speed. He must not forget to also measure the angle of superelevation of the curve with the indicator by halting the vehicle on the curve.

3. The observer calculates the safe and reasonable speed by the basic formula.

$$V = \sqrt{\frac{R\,(e + f)}{0.067}}$$

V = safe speed
e = Superelevation
f = Coef. of friction
R = Radius

The safe speeds determined for the horizontal curves are plotted on the condition plan.

[11] The Ball-bank indicator is used in twenty-three states in speed zoning.

Floating Car Study[12]

The observer attempts to record the speed habits and customs of the general public, using the route, by traveling over the route with a group of other vehicles. This "floating" with traffic means to attempt to follow a group of vehicles and reproduce their speeds and speed changes. This information is noted and referenced to the mileage. Data obtained from the floating car study are noted on the condition plan.

Sight Distance Studies[13]

Frequently the available stopping distance for the customary speed is not sufficient for the available sight distance at intersections, hills, or horizontal curves. As was previously stated, the intersectional problem should be solved by the installation of stop signs or other traffic control devices, if the route is important enough to speed zone. The question of insufficient sight distance on hills should also be solved by either no-passing zones or widening of the highway.

This leaves for consideration the sight distance for horizontal curves. They too should be partly solved by the elimination of passing, but the question of collision with objects or slow-moving vehicles in the road would still have to be solved by speed reductions for the available sight distance. Using the basic formula,

$$S = \sqrt{8\,R\,M}$$

S = Sight distance
R = Radius
M = Clearance from centerline to obstruction

The sight distance can be calculated and the safe speed determined by conversion using the table of minimum sight distances and speeds.[14] These determined speeds should be noted on the condition plan.

[12] Trial runs are part of the speed zoning studies in thirty-one states.
[13] Sight distance computations are used in twenty states for speed zoning.
[14] A Policy on Sight Distance for Highways, American Association of State Highway Officials, Washington, D.C.: The Association, 1220 National Press Building, 1940.

Spot Speed Study[15]

Locations which have been shown to be hazardous, or where speed changes are abrupt should be checked by "spot" speed measurement. Care must be taken to measure the actual speeds found at the locations and not to have the sample disordered by undue influence of excessively high or low speeds. Vehicular speeds should be measured in order. As soon as one observation is completed the next vehicle should be observed and no selection allowed. Samples must be sufficiently large, about 200 to 400 observations or two hours, and taken under normal conditions.

The value obtained from the speed study is usually the 85 percentile although some states advocate using the 70 percentile for rural areas and the 90 percentile for urban areas. The pace, the 10 m.p.h. increment that includes the greatest percentage of observations, is perhaps more important than the percentile because the posted speed should not, except in rare cases, fall outside this range. This information should also appear on the condition plan.

Transition Zones

At the entrance to urban areas from rural areas the speeds must be stepped down sufficiently far enough in advance so that the transition is not abrupt. There are two reasons for this desired smoothness in reduction in speed: one is so that speed-saturated motorists will be able to regain their sense of speed before entering the urban areas; and second, so that the motorist will be able to slow down in steps without resorting to the use of brakes. Abrupt and excessive braking is distasteful to the motorist as well as impractical due to physical and mental inertia. Determination of these step-down zones is by measuring the decelerations possible at these locations without the use of brakes from the normal rural rate of speed down to the required urban rate. Acceleration zones are not quite as important as the deceleration zones because in this case the public tends to create their own speed zones.

[15] Speed checks are included in the speed zoning studies of thirty-five states.

The pedestrian accident problem is a severe one at urban fringes and must be considered in the speed zoning of those areas.

Completion of Recommendations

With the speed data compiled on the condition plan, some states like to make out tables of the information (see illustration of Ohio State Speed Zoning Recap. sheet) and others prefer plotting the speeds from the various studies all on one graph.

From the method used, the procedure is the same—attempting to recommend speed zones of sufficient length so that there is no sudden acceleration or deceleration required, that transitions are smooth and all hazards are protected. Increments of 15 m.p.h. can be satisfactorily used for speed changes above forty miles an hour; ten-mile increments for speeds from forty to twenty-five; and five-mile increments below thirty miles an hour.

The mechanics of recommending installation varies. Many states have found that public approval has been easy to obtain by first speed-zoning all curves on the highway system, then rural-urban transitions, then locations of frequent accidents, and finally filling in the gaps.[16] Whatever may be the system for recommending the installation, uniformity as found in the *Manual on Uniform Traffic Control Devices* is recommended.

Organization

A suggested party of five people and one vehicle for speed is recommended. The party and their individual duties are indicated below:

1. Chief: directs field and office work, makes trial runs, road-log, ball-bank indicator measurements, speed and delay studies, floating car studies, evaluates results and makes final decisions as to recommendations for speed zones, prepares signing schedule.

2. Office Clerk: prepares strip or condition plan, makes acci-

[16] Thirty-six states reported that they did speed zoning for conditions found at entrances to urban areas; thirty-five speed zone for curves; thirty-two speed zone at high accident locations; thirty-two speed zone at pedestrian concentrations; thirty for intersections; twenty-six for narrow pavements; twenty-five for bridges and structures; and eighteen for hills.

dent analysis, reduces field work down to acceptable and usable form, makes necessary computations.

3. Two field clerks: make speed checks, volume counts, measure sight distances, curvature, superelevation, make notes on roadside culture, road condition.

4. Driver: assists chief.

Conclusions

The states in general agree that speed zoning is worthwhile if the speeds are reasonable. Their ideas on how to keep these speeds reasonable are also in agreement; to use the eighty-five percentile[17] in the original determination; to recheck frequently; and to use enforcement pressure.

Posting of signs in the states varies but the states are in agreement that signs should be reflectorized, should be standard, and should be posted sufficiently far in advance of the point of speed change to allow for perception, comprehension and reaction;[18] and in all cases the signs should be visible.

[17] Eighty percent of the reporting states prefer the 85 percentile.

[18] An average of two blocks in urban areas and ¼ mi. in rural areas in addition to the sign at the point of speed change. The advance warning signs dependent on usual vehicular speeds.

FBI Provides a Varied Program of Traffic Instruction

JOHN EDGAR HOOVER

Mr. Hoover entered the Department of Justice in 1917, and in 1919 was appointed Special Assistant to the Attorney General. From 1921 until 1924 he served as Assistant Director of the Bureau of Investigation and in May, 1924 he was named Director. Mr. Hoover is a trustee of George Washington University; a trustee of the National Presbyterian Church; a member of the Board of Directors of the Central Dispensary and Emergency Hospital, Washington, D. C.; a member of the Board of Directors of the Boys' Clubs of America; a member of the National Committee on Public Relations of the Boy Scouts of America, and an active member of the Grand Council of DeMolay. He has been admitted to practice law before the bar of the District Court of the United States for the District of Columbia, the United States Court of Claims, and the United States Supreme Court. On March 8, 1946, Mr. Hoover was awarded the Medal of Merit by the President of the United States, and on October 27, 1949, the "Theodore Roosevelt Distinguished Service Medal" by the Roosevelt Memorial Association.

A CHANGE in the attitude of police toward traffic law enforcement in the last fifteen years has brought about a growing demand for traffic training. Formerly traffic work was looked upon in some quarters as an undesirable job, one to which officers were often assigned as a disciplinary measure. Some departments considered traffic work principally as a job for recruits or officers who did not demonstrate sufficient ability to progress in other lines.

A few believed it should have no place in the police department's work. The magnitude of the traffic problem in recent years has changed the attitude of many departments. Today most police administrators recognize that traffic law enforcement is as important as any other major police duty and that the attitude of the public toward the entire police department is often determined by how well the traffic work of a department is handled.

Experience has proved that the development and operation of a

sound traffic law enforcement program is not a task for the untrained police officer, but a duty requiring men as capable and well-trained as good investigators. There has been a great demand, consequently, for training in this type of police work, and current conditions reflect that an even greater demand for traffic training will be forthcoming in the next few years as more cities experience the effects of increasing automobile use.

More than six million new motor vehicles were manufactured in the United States in the past year. Automobiles are now being driven more miles each year than ever before. The average age of the automobile before being junked has more than doubled in the past quarter century. Roads and streets are better, and three million new drivers are being added each year to our driving population—a total which in 1949 reached 53 million. These factors indicate that better traffic control will be an absolute necessity in the future. Many police departments, struggling with the traffic pattern in the past, will have even greater problems. Other departments, not heretofore experiencing much difficulty with parking, traffic congestion and accidents, will find growing problems in their cities.

One of the greatest needs today is for better control and supervision of traffic in rural areas. In recent years, while urban areas have reflected an appreciable improvement in accident rates, rural communities have not shown corresponding gains. The FBI recognized many years ago the great need for police training not only in larger cities but also in rural areas and small cities. America, in large part, is composed of small cities and large rural areas. Aid in police training in these places was necessary, because departments in small cities have found greater difficulty in obtaining qualified instructors. Consequently, a considerable part of the cooperative efforts of the FBI in the field of training has been directed toward such areas. Through local departmental schools, specialized schools, advanced schools, zone schools, regional schools and other types of training programs, the FBI has been able to assist local, town, city, county and state agencies in meeting their police training needs. Due to the scope of the traffic problem, instruction in traffic enforcement and control has been recognized as an essential part of such schools. To virtually all departments the traffic problem is a major responsibility.

FBI National Academy

The FBI, recognizing this need, introduced traffic training into the very first session of the FBI National Academy held in 1935. Traffic at that time was receiving recognition as a definite problem. Many communities, for the first time, were experiencing traffic accidents and serious congestion problems. Many police officials, although capable and well-qualified in other branches of police work, possessed no previous experience or training in traffic law enforcement. To some, the task was disagreeable, to be tolerated but if possible to be avoided. Some had tried various experiments in traffic control, ranging from very loose control to rigid enforcement of all regulations. They were frequently criticized regardless of the program they had undertaken. Many people, previous staunch supporters of the police, became hostile when they received a parking ticket, a speeding summons or a "bawling out" from an officer of the "old school."

Today the picture is changed. Every progressive police chief recognizes that traffic control is a major police duty and that the community will look to him to provide efficient, safe regulation.

Through the facilities of the FBI National Academy, traffic instruction has been provided for many officers who today stand at the head of their departments or in positions of responsibility. It is the purpose of the Academy to provide training for police executives and police instructors, who, of course, have a need for traffic training and instruction.

A study of the progress made by the 2,077 graduates of the Academy shows more than 26 per cent of all graduates now head their departments. Another group, much larger in number, occupy high administrative, executive, and responsible supervisory positions. This is a testimonial to the wise choice made by the local departments in selecting those who attend this school. Obviously all officers who have responsible supervisory positions and particularly those who are in administrative positions should have a keen appreciation and understanding of the traffic problem. The development of police executives and instructors cannot be accomplished without adequate training in traffic law enforcement.

The beneficial results of National Academy traffic training for the community may be illustrated by the following case. A graduate, upon the retirement of the chief who had selected him to attend the Academy, was appointed as the new chief. He had served, prior to his promotion, in many positions, from patrolman to head of the detective division. Nearly all his experience had been in general policing and as a criminal investigator. He had served in his department for nine years and was recognized as a capable police officer. When appointed head of his department city officials told him that although they expected him to carry on all police activities in an efficient manner, the most pressing problem was the traffic situation. He was instructed, therefore, to initiate and to conduct a sound program in traffic law enforcement and control. Later this officer reported that he had relied heavily upon the training he had received in the FBI National Academy to organize and conduct a traffic program which proved to be successful in the years which followed. It is believed that as a result of this training many law enforcement agencies have better traffic programs because their officials have a more thorough recognition of the importance of traffic control in the over-all police field.

Local Police Training

Traffic instruction in the National Academy represents only a fraction of the cooperative training services provided for police officers by the FBI. Years ago the FBI began making the services of its instructors available to local law enforcement agencies when requests were made for such assistance. Graduates of the Academy upon returning to their departments and others began requesting the FBI's aid in conducting schools. So great have been the requests for this assistance that in 1949 the Bureau cooperated in 2,509 schools for local law enforcement agencies. In the past five years such assistance was requested in more than 6,300 local schools. Year by year the number of such schools has increased.

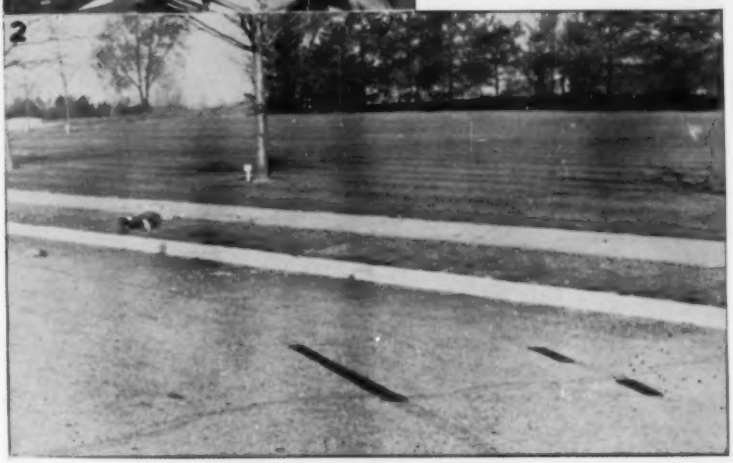
A majority of the schools conducted by the FBI are general police training schools in which basic subjects are covered. Others are spe-

cialized schools devoted exclusively to such subjects as fingerprinting, firearms training, traffic, defensive tactics, photography, records, and juvenile delinquency control and prevention. In 1949, one hundred and fifty specialized traffic schools were held. These specialized traffic schools have included as much as 100 or more hours of instruction, all devoted to a study of the traffic enforcement problem. The major portion of FBI training, however, is in general police training schools. Experience has taught that it is better to provide traffic training as part of general schools rather than to concentrate on specialized schools. Usually instruction is found more beneficial from a community standpoint in general police schools. There are, of course, exceptions, but the primary reason for including it in general schools is to interest all officers of the department in the traffic problems of the department. When traffic is integrated into a general police school, there is better opportunity to emphasize the responsibility which all officers have in the traffic enforcement activities of the department. It encourages teamwork in all the problems of the police department. Aside from these facts, nearly every law enforcement agency having a general police school will require that a fair share of the time of each school be devoted to traffic training. Therefore, traffic instruction is usually provided in all general police training programs and it is in these schools that a widespread contribution is made in police traffic training.

Zone Schools

In many instances the FBI has conducted specialized traffic schools on a zone or regional basis so officers from several departments, a county or even a larger area might be able to attend. Typical of these schools was the series of schools conducted in New York State in the early part of 1949 under the joint sponsorship of the FBI, the New York State Association of Chiefs of Police, and the New York State Sheriffs' Association. Officers in attendance at these schools reported they found the subject of traffic most profitable and interesting. They demonstrated an enthusiasm of a pleasing type in making traffic surveys, and many of the techniques which were taught have

During the period of February 25 to May 27, 1947, an FBI Advanced Police Training School was held for the Haverford Township Police Department, Pennsylvania. Special emphasis was placed on preservation of the scene of the crime, proper collection and identification of evidence, and investigative techniques such as photography, charting, casting and testifying in court. The following scenes depict the training methods used in the school.



1. A call comes in to the Haverford Township Police Department that a young boy, "Billy Bumper," aged nine, has been struck by an automobile which failed to stop and render assistance.

2. The body of "Billy Bumper" at the scene of the accident. Skid marks, broken glass, blood, etc., are noted by the officers.

3. Safeguarding the scene of the crime. Officers immediately rope off the street and post guards to prevent passing traffic from disturbing evidence.

4. Photography, notetaking, casting, searching, guarding and examination of scene skills are being utilized in this picture.

5. First aid. The victim is handled in a realistic manner.

6. Photography. Taking pictures of the accident scene. Other officers continue investigation about the body of the victim while awaiting the ambulance.

7. Charting. Officers measure the skid marks and their distance from the body of the injured child.

8. Casting. Plaster of Paris casts are made of the tire prints of the hit-and-run car which went up on the grass after striking the victim.

9. Search. Samples of oil, blood, glass, etc., which may have been left at the scene are secured.

10. Photograph of the tire impression.

11. Search of garages led to the location of the hit-and-run car. Fibers and hairs are found under the carriage of the car. The broken lens matches. The plaster of Paris cast is compared with the tire tread.

since been used. They were intrigued with the operation of the Enoscope in measuring speeds and were surprised to find that they could easily and accurately determine speeds of motorists. In one city a controversy, which had existed between a local newspaper and the Chief of Police, as to whether a speeding problem actually existed in a certain area of the city, was solved. This incident cultivated better relations between the newspaper publishers and the police department.

In another instance the President of the local Chamber of Commerce was so impressed that he promised to exert his influence with the city officials to obtain better traffic equipment and improved enforcement procedures.

One of the more popular courses in these schools was the subject of accident investigation. Interest was created in the subject initially by dramatizing the receipt of a hit and run case. Officers were called upon to question the complainant. Then, by using actual case pictures taken from the files of one department, it was possible to discuss methods of investigation which would be employed in each case. This would include such fundamental procedures as examinations of the victim's body, the preservation of evidence, examination of the suspect car, the photographing and drawing of the accident scene, and interviews. The climax of the case came with the questioning of the suspect by instructors. In the course of the suspect's interrogation, he was confronted by physical evidence and the results of the investigative leads. The scene ended with the subject's giving a signed statement confessing that he was the driver of the hit-and-run car. Fundamental investigative techniques can often be applied to such problems.

Another session, of special interest to the officers, concerned the subject of intoxication tests and the problems created by the drinking driver. Interest of the officers was undoubtedly provoked by the oft-repeated complaint that it is almost impossible to obtain a conviction for drunken driving. Films were used which showed how some police departments had used photography to obtain evidence against drunken drivers. The state laws relative to the admissibility of evidence were explained and the simple tests which any officer

may make were described and discussed. In addition, the need for chemical tests and various methods of conducting such tests were thoroughly discussed.

Accident Investigation Schools

The FBI conducts two-day accident investigation refresher schools for departments which desire to give their officers a "brush-up" in the techniques of conducting simple accident investigations and hit-and-run accident investigations. Major emphasis is placed on the necessity for thorough investigations, the proper collection, preservation and identification of evidence, the determination of the causes of accidents, and the preparation of complete, accurate reports.

Advanced Police Training Schools

Typical of the Advanced Police Training Schools conducted by the FBI was the school for the Haverford Township, Pennsylvania Police Department. Special emphasis was placed on the preservation, collection and identification of evidence, investigative techniques, such as interviews, photography, charting and casting, and the preparation of cases for court, as well as testifying in court.

The entire school was developed around a hit-and-run accident in which a small boy was supposedly struck by a passing car and seriously injured. A boy, nine years of age, known as "Billy Bumper" for the purposes of the case, was found lying at the side of the road by a passer-by who immediately called the police department. The accompanying photographs illustrate the type of training provided in such a school. Every step is painstakingly carried through, as though occurring in an actual case. Instructors and designated observers make notes on all steps taken by the police to develop their case and prepare it for court. Reality is given to the case to the maximum extent possible which gives the police experience in meeting the various problems created in actual cases. Finally local judges, prosecutors and attorneys are invited to assist in conducting a moot court trial of the accused. Prior to this time, however, all the investigative techniques have been employed in the investigation. All

evidence will be carefully preserved, identified and "examined" by the experts who will testify in the moot court. In the moot court, officers will be required to testify; they will have an opportunity to see how evidence is admitted, and why it is necessary to exercise care in preserving such evidence.

Technical Studies

In all of its traffic instruction, the FBI has encouraged police officers to adopt factual approaches to the solution of enforcement problems. The importance of accident facts in developing a sound program of enforcement is emphasized. It is well recognized that to do a good job of accident prevention, police must know what causes accidents, when they occur, what violations are involved and what action should be taken to prevent similar accidents. Thorough investigation of accidents and accurate, complete reporting are required to obtain these facts. Accident investigation is a basic subject in all police training schools.

Another method used to develop an appreciation for a factual or technical study of traffic problems has been the training given in conducting simple enforcement studies in police schools. These studies are essentially surveys at problem intersections or locations where some improvement in traffic control is needed. Officers are taught how to conduct volume studies of vehicle and pedestrian traffic; how to make observance studies of traffic signals, stop signs, speed and turning regulations; and how to study a group of reports on accidents at an intersection to determine their common causes. With very little training it is possible to show officers how they may conduct these studies and how their departments may benefit from the use of factual data they collect.

One department, after receiving this type of training made a series of observance studies at several high-accident intersections where traffic was controlled by stop signs. These studies showed what might logically be expected. Many motorists were failing to stop completely before entering the major streets. There were numerous accidents. When the facts were known greater attention was given to the enforcement problems involved. A checkback on the accident

picture several months later revealed that much improvement had been made and that fewer accidents of the type usually resulting from such violations were reported.

In another community the enforcement of speed limits was greatly improved as a result of a series of studies conducted at various points where speeding violations were frequent. When it was found that nearly one-half of all motorists passing the points of study were violating the speed limits, police authorities decided that their program on speed control required thorough study and overhauling. Although some officers not primarily involved in traffic enforcement, at first, doubted the value to them of this type of training, usually they were surprised to see how easily such studies could be made and how much factual information of real value obtained in a short period of time and they find pleasure in the resulting improvements.

This training, although it may not be utilized immediately by some officers who receive it, does encourage the use of factual data to study problems. One of the ways in which this training can be readily used by every department is in the handling of traffic complaints. The department may receive a complaint that speeding is common on a particular street. If an officer knows how to conduct a speed study, he can with little equipment obtain sufficient facts in a short time to substantiate or disprove the allegation. It is then possible for the department to advise the complainant of the results of the study and to take whatever action the facts indicate to be warranted. Handling complaints in this manner will develop better public relations and provide factual data for the department in determining what should be done on all such matters.

Training for All Officers

In all traffic instruction that is provided by the FBI, an attempt has been made to develop more interest for traffic law enforcement among all officers of a department. All officers should be prepared to enforce traffic laws in the regular course of their duties. Although the need for specialization of duties on a staff basis is recognized, over-specialization on a line basis tends to encourage apathy, indif-

ference and a disregard of traffic violations by some officers not assigned to the traffic division. This often results in less effective enforcement of traffic laws, an increase in violations and a corresponding trend toward more traffic accidents. To prepare more officers for these regular enforcement and control functions promotes teamwork, versatility, adaptability, and trains otherwise qualified personnel for promotion to broader administrative and executive positions.

It is encouraging to see that law enforcement agencies are now recognizing the proven merits of this increased interest and knowledge of a big problem in most all departments.

Pedestrian Protection and Control

ARTHUR E. MILLER

Mr. Miller has been a member of the Metropolitan Police Department, Washington, D.C. for over 31 years. He was promoted through the various grades and while a captain was awarded a Fellowship to attend the Traffic Administration Course at Northwestern University Traffic Institute, Evanston, Illinois, for the academic year 1939–1940. Upon graduation he was promoted to Inspector and placed in charge of traffic enforcement. Washington, D.C. was awarded nine first-place awards in traffic safety during Mr. Miller's service in this position. On April 1, 1950 he was promoted to Assistant Superintendent and assigned to Duty as Director of Training Division, Recruit School, Washington Police Academy and Traffic School for Violators.

A PHASE of the traffic problem that is vital to all of us—and we have had some success with it in Washington—is the Pedestrian Protection and Control Program.

It should be thoroughly understood that carrying on a successful pedestrian program needs much more than enforcement. Many persons and officials in traffic safety work seem to feel that enforcement will take care of everything. With no wish to minimize the effectiveness or importance of good, sound, reasonable enforcement, it should be pointed out that this incorrect thinking has resulted in failure on certain occasions, not only in pedestrian programs but in other phases of traffic control.

Pedestrian injuries and deaths comprise about 50 per cent of our problem, with about 75 per cent of the traffic deaths in cities being pedestrian. Therefore it is a very important subject and one which has been neglected in many places. In fact, little attention has been given to it for various reasons. However, if we expect to handle the problem intelligently and selectively, we must consider the protection and control of the pedestrian on our streets and highways. It is a difficult task requiring the cooperation of all concerned, from the top officials on down the line.

A few figures may serve to indicate that the pedestrian program

has prevented injuries and deaths in Washington, D. C., during the past decade. The regulations, effective in March, 1939, require pedestrians to obey signals and prohibit crossing between intersections so as to create a hazard. These figures show the year immediately prior to the enactment of the regulation and periodically afterwards.

	Fatal	*Pedestrian*	*Total Injuries*	*Pedestrian Injuries*	*Per Cent*
1938	86	63	3,722	2,114	57%
1943	97	63	2,982	1,546	52
1946	72	57	4,293	1,997	47
1949	71	51	5,203	2,215	43

It should be remembered that the population of Washington increased at least 50 per cent during the years mentioned—600,000 in 1939 to about 900,000 in 1949. This does not include nearby Maryland and Virginia which showed even greater percentage of growth.

According to a national survey, the public has accepted or will accept a sound pedestrian control program—at least to a considerable degree. According to the survey about 70 per cent were favor of actually requiring pedestrians to obey the signals at all times.

What is necessary to inaugurate and carry on a good pedestrian program? First, it should be definitely determined that the majority of people in a particular city are in favor of such controls and restrictions. Also, the press and radio stations since they can assist or hinder the proposed program considerably, depending upon their attitude and participation.

Signals and Official Attitudes

If these findings are favorable, determine whether the traffic signals are conducive to pedestrian control and pedestrian *protection*. If we require pedestrians to obey signals and not cross between intersections, we must also protect them adequately when they are complying with the regulations.

Most traffic signals were installed, and some still are, for the convenience and control of vehicle drivers almost exclusively. The pedestrian wasn't considered, at least to any extent, and therefore is not adequately protected at most signalized intersections.

Determine also what the police, particularly top officials, think about actual enforcement; then what prosecutors and judges think. If all opinions are favorable, examine the regulations to see if they are complete, reasonable, and enforceable. Regulations for pedestrians must be specific. Do not depend much on the judgment of either pedestrian or officer concerning, for instance, when a person has created a hazard when walking against a red light. If there is to be tolerance in the enforcement of pedestrian regulations, control it by a uniform policy.

After all these problems have been considered and the program is definitely planned, set a date for the actual enforcement, which should be from one to three months hence. During this time carry on a good meaty educational campaign by newspaper stories, editorials, cartoons, radio messages, interviews, pamphlets, and other educational media distributed in various ways. The information given the public should be accurate and factual, with particular reference to the pedestrian phase of the traffic problem: How an improvement can be made; what has been accomplished in other places; what has been done to afford pedestrian protection by changes in signals—their position, timing, prohibition on turning movement of vehicles —and the anticipated enforcement of the regulations applicable to vehicle drivers who fail to yield right-of-way to pedestrians.

During the time the educational campaign is being carried on, a training program should be conducted in the police department. Prosecutors, judges, and police officers should understand the problem; why it is being done, how to approach pedestrians, the enforcement of the pedestrian right-of-way rules, and the detailed policy of the department with respect to both the pedestrian and the vehicle operator. The top officials in the police department should be in sympathy with the proposed activity, and sincerely interested in good results in order to gain the interest and cooperation of every officer who actually does the work.

Enforcement Procedure

When the time comes for actual enforcement, officers should be stationed at reasonably heavily traveled intersections. They should

try in every reasonable way to have voluntary obedience to the signals and apply enforcement only in flagrant violations, particularly at first. When a person is actually approached, he should be advised of the violation in a courteous tone of voice, and asked if he is familiar with the efforts to *protect* him.

The theme of protection should be emphasized. If he is a visitor, a courteous warning is generally in order. If he is a resident and knows the regulations, is familiar with the previous educational campaign, and is apparently a deliberate violator, a traffic violation notice, such as is used for motor vehicle operators, should be issued if the person produces proper identification. He can then call at the violations bureau, any police station, or other designated place and deposit collateral, at which time he can elect to forfeit or stand trial.

If the violator refuses to cooperate an arrest should be made with the least possible notice, commotion, or disturbance. It should be emphasized that an arrest should be made only as a last resort, but if it is justified the officer should be supported in his action and full publicity given the incident.

The pedestrian protection and control program, both enforcement and education, should be constant and continuous. If conducted properly, it will be accepted by most reasonable people.

Enforcement of the pedestrian regulation is a rather personal activity, and everyone connected with the program must be in sympathy with it and pursue it with reason, courtesy, and vigor. An apathetic attitude in one or two key officials will result in an unsuccessful program, and in that case it would be better not to have started it at all.

A good pedestrian program requires (1) public support; (2) good sound regulations; (3) proper traffic engineering devices and markings; (4) proper enforcement; (5) a continuous educational program, and (6) a lot of *courage*.

1. *Public Support:* It is essential that responsible organizations, in addition to the newspapers and radio stations, endorse and support a pedestrian program. Such groups include Board of Trade, Chamber of Commerce, Federation of Citizens Association, Business Men's Clubs, and others. If these groups are furnished proper records and facts justifying a need for pedestrian protection and con-

trol, they will not only support the program, but will influence other groups and persons in many ways—financially and otherwise.

2. *Good Sound Regulations:* The Model Ordinance regulations with respect to pedestrians are suggested as they represent the soundest thinking in traffic safety and make for uniformity. Uniform regulations are very desirable because regardless of where a person may be, he will know what to do and what not to do.

3. *Proper Traffic Engineering Devices and Markings:* Traffic signals should be so located and timed as to afford the maximum degree of pedestrian protection. Signals hanging in the center of an intersection are not conducive to pedestrian obedience. A signal in front of the pedestrian is preferable. The best system is to have a signal on each corner, with a double signal head. This provides a guide for the pedestrian to "walk to" at all times, and is helpful to the vehicle driver in case the one on the right is obstructed by a large vehicle.

"Walk" and "Don't Walk" signals may be desirable at some locations. They are expensive and occasionally slow vehicular traffic unnecessarily. If a pedestrian is instructed to "Walk" he should have absolute protection; vehicular traffic should not cross his path —right or left turns. Otherwise, "Walk" lights are misleading and give the pedestrian a false sense of security. Considering all angles, it is believed that pedestrians and vehicles should be controlled by the same signals, but it should be emphasized that turning vehicles yield the right-of-way to pedestrians proceeding on the proper light.

Pavement markings are desirable at many locations and at all signalized intersections. They not only guide the pedestrian but afford protection by denoting the place where vehicles should stop.

Pedestrian barricades are helpful at unusual intersections, bad angles, and off-set intersections. It is impossible to control pedestrians and afford them a safe crossing without barricades and appropriate signs at unusual places.

4. *Proper Enforcement:* Actual enforcement should be applied only where voluntary obedience is impossible, in accident cases, or where warnings have not proved to be effective. When a person walks against the signal and an accident results, he should be prosecuted. This may be done by the issuance of a ticket, a summons to appear

in court on some future date, or an actual arrest, depending upon the facts and circumstances. To protect the driver and as a deterrent to other pedestrians, proper action should be taken against a pedestrian when he violates the regulations, just as is done in the case of a vehicle operator. Enforcement must be impartial.

5. *Continuous Educational Program:* This includes providing newspapers with all essential information on accidents, the causes, proposed action, and remedies of all kinds. Statistics furnished frequently, show results readily understood by the average citizen. The use of stencils on the streets and sidewalks is helpful to pedestrians. Safety pamphlets giving *local* information, distributed through schools, churches, and various other ways, have proved effective.

6. *Lot of Courage:* All these things must be done in an impartial way, particularly enforcement. The general public will support a program if everyone is treated alike. But if certain influential persons receive "preferred treatment," or have tickets fixed, the program will become ineffective. Therefore police, prosecutors, and judges must be sincere, impartial, reasonable and courageous. It takes a lot of "backbone," but it is absolutely essential if an effective pedestrian enforcement program is to be maintained.

Supervising, controlling, guiding, or planning any phase of the traffic problem means dealing with human beings and no one is perfect. Errors occasionally do occur. Striving always to be broad-minded, sincere, tolerant, and to consider the other person's viewpoint and problems will promote efficiency and good relations. Valuable time will be saved, life will be pleasanter, and most important, we shall go farther toward accomplishing our goal—the prevention of congestion, accidents, injuries, and deaths on our streets and highways.

A Traffic Administration Plan Series: Coordinating Local Traffic Activities

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PART THREE

TRAFFIC AFFAIRS involve the work and interests of practically every agency of city government. While the grouping of traffic activities is desirable in city organization and administration, it must be recognized that the traffic function cuts across the established duties of many agencies of municipal government. Coordination of the many and varied traffic activities is a major objective of traffic administration.

Ways must be found of getting all departments and agencies of the city's organization to assume effective responsibility for those functions that fall within their framework. In addition to activities of official bodies, there are many businesses, civic organizations and other groups that are concerned with traffic safety and highway transportation needs. The proper coordination of all these in a manner that will develop a maximum effective effort is a challenging problem.

A common method of attempting coordination is to create a traffic committee or commission. Many types have developed from efforts to achieve concerted action by all responsible agencies and authorities. This discussion deals with municipal matters, but most principles and factors of coordinating traffic activities can be applied readily to statewide programs.

Basic Types of Traffic Commissions

Considered in terms of personnel, there are two basic types of municipal traffic commissions. One consists of city officials, representing departments with delegated traffic authorities and responsibilities, and has as its principal function the coordination of official traffic activities. The other might consist of citizens alone, or of both citizens

and city officials; it usually undertakes functions similar to the first type plus a program of public safety education. In some cases the commissions are created by ordinance; a few are prescribed by charter; some result from administrative orders by city executives; and many are entirely unofficial, with their origins in civic and business agencies.

A fairly new plan is to create the commission as a part of, or as the guardian for, a newly established traffic function, such as traffic engineering. There are commissions with assigned duties and powers but most of them have only advisory rights. It must be recognized, therefore, that the organization structure and the power and duties of municipal traffic committees vary widely. It is probable that very few are exactly alike.

There are many reasons for variations in traffic commissions—basic plan of city government, traffic organization, local traffic programs, state requirements, fiscal limitations, personalities, etc. But the great variety of plans suggests that the fundamental purposes for and requirements of such bodies have not been well established.

Extraneous groups that may create individual or collective traffic committees include local safety councils, chambers of commerce, motor clubs, school associations, and other similar organizations interested in traffic and safety.

The Model Traffic Ordinance[1] has recommended a traffic commission for cities. It would establish by law a traffic commission consisting of: (1) the traffic engineer; (2) chief of police; (3) chairman of city council traffic committee; (4) representative of city engineer's office; (5) representative of city attorney's office; and (6) other city officers and representatives of unofficial bodies designated by mayor. If the commission is to perform general public safety education activities, the Ordinance[2] recommends the following members in addition to the official representatives:

"(1) The judicial official who handles most of the traffic cases.
(2) A representative of the board of education.
(3) A representative of the city planning commission.
(4) A representative of the fire department.

[1] Model Traffic Ordinance, U. S. Govt. Printing Office, 1946, p. 6, Sec. 30.
[2] *Ibid.*, p. 7.

(5) A representative of the public utilities regulatory body, if any.
(6) A number of citizens vitally interested, including the following:
  (a) Representatives of the mass-transportation companies.
  (b) One or more representatives of business organizations.
  (c) Representatives of civic and professional groups such as the automobile club, engineers club, local safety council, chamber of commerce and junior chamber, and the parent-teachers association.
  (d) A representative of trucking interests.
  (e) A representative of taxicab companies.
  (f) A representative of automobile insurance companies.
  (g) One or two newspaper editors."

The mayor would appoint the chairman. The Model Ordinance would assign the commission five duties: (1) Coordination of traffic activities; (2) conduct of traffic safety educational activities; (3) publication of traffic reports; (4) receipt of complaints; and (5) recommendation of ways and means for improving traffic conditions and the administration and enforcement of traffic regulations.

The Committee on Organized Public Support of the President's Highway Safety Conference[8] suggests two groups. One is a coordinating committee of officials, including the heads of all departments charged with or related to highway safety. This Committee would (a) appraise conditions and determine needs for an effective program; (b) coordinate safety activities and jurisdictions; and (c) advise public of analyses, activities and needs.

The other group would be a public-support traffic safety organization. It would be free of partisan politics and would offer full opportunities for public expression and participation. A supporting, advisory, and consulting program would be created to aid the official traffic safety program.

Survey of Commissions

Information was collected from a number of cities representing many geographical areas and population groups. Organizations and activities of traffic commissions found in these cities are reviewed in

[8] Report of Committee on Organized Public Support, President's Highway Safety Conference, Washington, D. C. 1949. p. 4–5.

Table I. It will be noted that activities of the traffic groups vary from the simplest advisory services to major fixed responsibilities.

Of traffic commissions of 13 cities, all except three have official status in that they were created by ordinance (8), resolution (1), or chartered (1). They vary in size from six to 100 members; eight have no more than 12 members. In most cases the membership is fixed by action creating the committee. The personnel of seven of the committees consists only of appointed or elected city officials. Four are constituted of officials and others. Two committes have only members who are not city officials, but in each of these, officials serve as ex-officio members. Ten of the 13 committees have any member serve as chairman; in 4 of these cases the chairman is appointed by the Mayor, while in the others he is elected. In two cities enforcement officials are designated as chairman. The ordinance creating the Committee (consisting of officials and citizens) specifies that a citizen member must serve as chairman, but that member is elected by the entire personnel.

Officials serving on the committees usually include:

1. Councilmen (or Aldermen)
2. City Manager
3. Traffic Judge (City Solicitor or Corporation Counsel)
4. Director of Public Works (or City Engineer)
5. Safety Director (or Director of Public Safety)
6. Traffic Engineer
7. Chief of Police (or Director of Traffic Division)
8. Planning Director (or Planning Engineer)

Other officials serving on the committees in the cities studied are:

1. Chairmen, Council Committees (traffic or police)
2. Representative Parking Commission
3. Superintendent of Lighting
4. Manager, Transit Operations (or Commissioner, Public Service)
5. Fire Commissioner
6. Superintendent of Schools
7. Members of special highway authorities
8. Fiscal officer

While many different official city agencies can be included on the traffic commissions, it is seen from the above listings that police,

engineers, and aldermanic representatives most frequently make up the personnel of the official bodies.

Activities are specified in most of the cities. In a very few cases they are stated in general terms, leaving the committee much leeway. It will be noted in Table I that most of the agencies have *coordination* as their prime objective. In Atlanta, the commission is required to review all ordinances providing for the control of traffic and to recommend to city council. The Traffic Committee of Detroit has very broad powers relative to curb parking, one-way streets, speed limits, pedestrian regulations, routing, through streets, and other traffic regulations. New York City also gives broad traffic powers to its Traffic Commission. Springfield, Massachusetts, singles out authorities relative to cabs and delegates them to the Traffic Commission.

In New Haven, New York, and Springfield, the Traffic Engineer is directly responsible to the commission. The latter two cities create the office of traffic engineer as a part of the commission, in the same ordinance setting-up the commission.

Advantages Claimed for Traffic Commissions

Some public officials and traffic professionals consider traffic committees or commissions essential to the overall municipal traffic program and list many advantages for them.

The principal advantage of a traffic committee is coordination of the traffic efforts of the many different offices, agencies and individuals concerned with the total problem. Working at cross purposes is minimized.

A traffic committee promotes a better understanding of traffic activities and needs among key city officials, and between officials and the public or civic bodies. After a proposition has been thoroughly discussed by the commission and approved, it has the backing of the entire commission. This should be valuable in getting final action. It is obvious that by bringing together the various department heads of cities, many of whom have direct traffic responsibilities, it is much easier to develop a common understanding of traffic problems and needs than it would be to deal with each of them individually. Sev-

eral traffic authorities reported a high degree of cooperation as a result of meetings of department heads.

A frequently cited advantage of traffic commissions is that of serving as a "buffer" between public, business and civic groups, and city officials—particularly those officials charged directly with traffic administration duties.

Traffic committees are used to advantage in some cities to inform the public. Ideas can often be much more appropriately presented by a committee of official and unofficial members than by the individual city administrators who are concerned and charged with the problem.

Local traffic commissions may perform the job of sponsoring new traffic regulations, policies, and correct practices before they are actually instituted in an official manner. They can also support traffic enforcement, court procedure, and technical work undertaken by engineering bodies.

Group thinking, such as a commission provides, can often keep inaccurate personal proposals from being adopted.

A traffic commission can render a valuable service to city authorities and to city legislative bodies by carefully reviewing proposed traffic ordinances and changes in traffic regulations. Sometimes these changes must be considered in areas where there are few precedents and no local experience. A broad and comprehensive study by a traffic body of heterogeneous character can be the means of finding deficiencies and other undesirable aspects of proposed regulations and administrative orders.

Traffic commissions can accelerate some traffic activities by enabling individual officials and departments to overcome jealousies and inertia. This is particularly true if the commission is made up of key officials and civic leaders. The traffic commission can do much to take the heat off local traffic authorities. On the surface this does not appear to be a valid justification for such bodies, but it is nevertheless reported by many traffic professionals from cities experienced in working with traffic committees.

Some traffic commissions are able to present traffic problems to business groups as *community problems*. They show the needs of drivers as well as the desires of merchants. The public, commercial,

civic and business groups are apt to favor traffic committees because they feel that they provide a formal channel through which they can make their wants, viewpoints and feelings known to the proper city authorities. The mere existence of an organization or a channel of this type might do much to overcome resistance which frequently develops when sound traffic proposals are made. It is the old case of everyone liking an opportunity to be heard and it has long been known that all individuals and groups have viewpoints or ideas as to how a traffic situation should be handled. An opportunity to express these ideas and viewpoints is provided by the traffic body. Through the commission, traffic programs might be developed "in light of public reaction."

Whether or not the traffic committees are used in an official capacity, an advantage might be cited for them if they serve as the outlet for "traffic safety propaganda." It is unfortunate that this type of information inevitably develops in most cities in connection with so-called traffic safety educational activities.

Disadvantages Claimed

While many favorable things have been heard about traffic commissions, committees and similar groups, it must be recognized that such agencies are also subject to criticisms. There are potential disadvantages growing out of their formation under certain conditions. Some of the most commonly recognized deficiencies can be discussed.

It is often found that traffic committees initially composed of individuals who have a sincere desire to improve traffic matters for the city soon become a body of "experts." When this happens the committee is apt to overlook the principal functions for which it was created and to embark upon programs of directing traffic authorities to do things which may not be for the best interest of the city and the public at large. Several instances are known where a traffic committee performed well the "coordinating" and "selling" tasks in its early months of operation, but soon became a body of traffic "experts" who attempted to dictate what should be done, even in technical spheres of traffic work. This type of development

is obviously undesirable. It produces conflicts, differences and resistances which hinder rather than aid coordination.

Biases and selfish viewpoints may come up in the committees. Some members, particularly department heads, may be unwilling to take a broad and unselfish view of overall traffic needs. They see them primarily in terms of the desires and activities of their particular departments. This thwarts progress and integrated action.

When there are one or two unusually strong personalities on the commission, it is sometimes found that they gradually take over primary control of the entire committee's activities. The committee thereby loses one of the fundamentals for which it was created—a broad representation of viewpoints.

Some committees have produced negative results when they accepted compromises in traffic matters and proposals detrimental to professional and technical development within the community.

The lack of knowledge of principal aspects of traffic control and planning is another disadvantage of the committees. This criticism can be especially aimed at the committees which are made up of lay representatives.

Indifference is another quality which is apt to develop as an undesirable factor in traffic committees. Appointment of city officials, or others to the committee who have no desire whatsoever to do a job on traffic matters should be avoided. They are apt to assume an attitude of indifference which tears down the morale and prevents the overall committee from engaging in worthwhile activities. This situation has resulted in the failure to get a quorum for committee meetings because there were insufficient willing sacrifices of time.

Many cities reported that traffic committees flourished during their early life but that the newness soon wore off and the individual members lost interest rapidly. This is traceable to weak leadership, but in some cases the committees have become entirely dormant, never having a meeting or otherwise taking interest in the local traffic problems and program. While this is to be expected of the purely advisory bodies, it has also been reported for the traffic commissions which have been assigned traffic duties and responsibilities.

Some traffic committees have been guilty of hampering and ac-

tually interefering with the work of the city traffic agencies by introducing redtape or injecting unfair criticisms and influences.

Traffic committees made up primarily of people who know little or nothing about technical traffic affairs often concern themselves almost exclusively with signs, signals, markings and with educational activities, overlooking many other fundamental areas of traffic development. They will devote their activities almost 100 per cent to traffic law enforcement simply because one or two members, or an unusually strong member, have preference for a single phase of work. A broad approach is desirable.

With a few types of committees, political influences have developed a bad situation. It may be found that where political factions exist within a committee having several councilmen among its membership, the votes are political rather than based upon the traffic need or technical soundness of a particular problem.

Apparently an occasional situation develops in which "crackpots" or insincere committee members do foolish things. A favorite approach is to ask the impossible of city officials and try to stir up a publicized controversy in an attempt to gain personal attention at the expense of true traffic needs.

The large size of some committees, and their tendency to grow, makes them awkward and unwieldy. Disagreements within the committee's own ranks might retard needed actions and hamper sound activities.

Coordination vs. Policy Direction

Committees or commissions can be valuable in coordinating the over-all traffic program and in developing support for its various components, but creation of such agencies to supervise and direct the work of any one traffic unit is not recommended. Carrying out a professional traffic job, such as traffic engineering, becomes far too complex and involved when it must be done through a committee.

Insofar as the work of a single traffic agency is concerned, there is no more reason to subject it to strict supervision of a committee than to so control the work of other major activities of city government. For example, the traffic engineer should be in a much better position to provide technical engineering solutions for traffic and

transportation problems and to plan for traffic control if he is delegated authority and is not required to report for policy formulation to a traffic committee.

When it becomes necessary for a traffic committee, whether constituted of officials or laymen, to undertake technical and professional traffic functions, deficiencies in the city's organization or in staff abilities are indicated. If the necessary traffic units have been created and the proper technical assistance provided, it becomes unnecessary for the committee to render technical services.

Many public officials who have specific traffic responsibilities are appointed because of their specialized knowledge and experience. It is not proper to require them to report to a committee which might control them on the basis of "pressures" and "whims" rather than in terms of sound traffic needs.

The traffic committee or commission should coordinate and cooperate, but should not direct the work of individual agencies.

This does not mean that the various traffic authorities, including traffic engineers, police, and educators should object to the proper type of committee. They should not, however, have their individual functions directed and controlled by such a body. By the same token, traffic officials should not be allowed to hide behind a committee and to shirk a responsibility which is rightly theirs.

Other Methods of Achieving Coordination

Much attention has been given to traffic commissions because they are a common device intended to coordinate municipal traffic affairs. They do not provide the only means of effecting a sound traffic program. Actually, the disadvantages already cited make the creation of commissions objectionable to some public officials.

Many traffic authorities feel that they can achieve the necessary assistance and coordination in the discharge of their duty by directly discussing specific problems with the various business and civic groups and with other city officials. As one official put it, "We see no need for a particular traffic or safety commission to 'wave a flag' in the interest of safety or to 'high pressure' certain individuals, officials, or organizations."

A dynamic leadership by the city's chief executive can provide coordination of all official traffic activities. This type of leadership has been discussed in an earlier article. A sound traffic organization and proper delegation of authority in traffic matters make the job easier, but a strong executive can usually force coordination of traffic affairs, even with an awkward organization. Political controls and differences are likely to be the principal interference to such an approach.

Some cities develop a plan of traffic coordination through a special traffic committee of the Council or Board of Aldermen. Such legislative committees can coordinate the work and traffic actions of the entire legislative body. To keep abreast of activities and needs within the city's government, they must keep intimately informed about each department and persons engaged in traffic work. In this way they are able to detect inadequate cooperation and certainly no group is in better position to see that something is done to correct the situation.

Some forms of city government, such as the Commission Plan, lend themselves to a ready coordination of diverse affairs like traffic. Through frequent meetings of key department heads, subjects like traffic, which cut across many spheres of activity, can be discussed and differences resolved so that adequate integration is developed.

Sometimes a mayor will plan public hearings or conferences to discuss traffic and road safety matters. These can, at least in part, serve as media for coordinating principal activities concerning the laity. In Louisville, Kentucky, the mayor regularly assembles his department heads and invites the public to attend and voice comments and criticisms relative to municipal affairs. These sessions, titled "Beef Sessions," are providing a popular outlet for traffic suggestions and complaints. They keep city officials apprised of citizens' wants and enable them to coordinate the overall traffic program.

A parallel can be drawn between the indicated trend in traffic commissions and the trend in basic patterns of city government. A few years ago the Commission plan of government was common. One of the main arguments in its favor was the ease of effecting coordination between the various organization branches and func-

tions. Recently this plan has yielded to strong executive types of city government.

Today there is a marked trend toward city manager plans—professionalization in city government. It seems likely that traffic organizations will follow a similar pattern. The committees and commissions will become less important and will cease to exist as the various governmental units develop and acquire the necessary traffic professionals. Traffic coordination will become administrative coordination and the mechanical aspects of coordination will be combined by the executive with the psychological foundations of human behavior. The committee system, if it exists at all, will serve only as an adjunct.

Conclusions

There are mixed feelings among public officials and traffic experts as to the desirability of traffic commissions. Some insist that they are essential to a balanced and effective program; others think they are useful only in a very limited way; and there are those who consider them undesirable and to be avoided. There are numerous examples to support each viewpoint.

To develop a proper understanding of all traffic activities and problems throughout all components of local government, a committee of city officials, department heads, can be useful. With strong leadership by the city's chief executive, such a committee can function well as an informal body. It provides a convenient and logical medium, through which traffic affairs can be discussed, argued, and the best plans for coordination derived.

When a formal traffic commission is created, its functions should be only advisory. This should apply whether the body consists of city officials alone, of appointed citizens at large, or of a combination of the two. It should coordinate, sponsor, and abet the programs and activities of the governmental units engaged in various traffic functions.

It does not appear advisable to establish a major traffic function as an integral part of a committee or commission. Traffic problems are developing major responsibilities which warrant governmental

units to deal with them in a conventional administrative manner. Harnessing them with a committee is likely to retard development and action.

There are numerous ways in which traffic programs can be effectively coordinated without the establishment of formal commissions.

In the final analysis, local conditions should determine the desirability of a traffic commission. If it is apparent that such a body is needed, then again the local situation should govern the character of the group, both as to organization, personnel, duties and activities.

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Table I

Organization and Activities of Typical Traffic Commissions and Committees

City: ATLANTA, GEORGIA
Name: Traffic Commission
Created by Ordinance. Official
12 members appointed by the Mayor: 1. City Traffic Engineer; 2. Chief of Police; 3. Chairman of City Council Police Committee; 4. Chief Traffic Recorder; 5. Other Citizen Representatives (official and civic) as appointed by Mayor
Director or Chairman: Any member designated by Mayor
Compensation: None

Activities:

1. No ordinance providing for control of traffic shall be enacted by General

Council until after it has been submitted to Chief of Police and Traffic Commission.
2. Carry on educational activities in traffic matters.
3. Supervise publication of traffic reports.
4. Receive suggestions and complaints dealing with traffic.
5. Recommend to General Council and City Traffic Engineer, the Chief of Traffic Division, and other city officials ways and means for improving traffic conditions and the administration and enforcement of traffic regulations.

Comments:

1. All proposed traffic ordinances referred by General Council to Traffic Commission shall be reported back within 30 days after such reference with its recommendation, otherwise Council may act on proposed ordinance without recommendation of Traffic Commission.

City: BALTIMORE, MARYLAND
Name: Board of Consultants of Community Council on Street Traffic.
Created by Civic Action. Unofficial
Number of members: Not fixed
Appointed by Community Council: 1. Director of Public Works; 2. Director of Planning; 3. President of City Council; 4. Traffic Engineer; 5. Inspector of Traffic; 6. Representative of Off-Street Parking Commission
Director or Chairman: Any member
Compensation: None

Activities:

1. Determine civic viewpoint through Community Council.
2. Coordinate activities of Department heads.
3. Advice to Mayor and Council.

Comments:

1. Board has no authority in itself nor assigned duties, but each department head has jurisdiction, duties and powers in different areas of traffic operations.

City: CINCINNATI, OHIO
Name: City Manager's Traffic Coordinating Committee
Created by Administrative Order. Unofficial
15 members appointed by City Mgr: 1. 5 citizens; 2. Chairman Traffic Committee of City Council; 3. Safety Director; 4. Traffic Engineer; 5. Supt. of Police Highway Safety Bureau; 6. City Planner; 7. City Engineer; 8. City Solicitor; 9. Asst. City Prosecutor; 10. Presiding Judge, Municipal Court; 11. Municipal Judge, Traffic Court Bench

Director or Chairman: 1 of 5 citizen members
Compensation: None

Activities:

1. Speed control.
2. Line markings.
3. Street widths for new and rebuilt roadways.
4. Compulsory reporting of accidents.
5. Bicycle licensing.
6. Education.
7. Safety of city vehicles.
8. Use of radar speed meter.
9. Revising Traffic Code.

Comments:

1. Has little direct authority but uses that vested in City Manager.
2. Another group, the Metropolitan Traffic Safety Council, conducts general traffic safety educational program.

City: DALLAS, TEXAS
Name: Citizens Traffic Commission
Created by Incorporation. Unofficial
100 members, appointed by Represented Organizations: 1. Civic leaders; 2. Public Officials; 3. Organization representatives of city and counties of Dallas
Director or Chairman: Elected
Compensation: None

Activities:

1. Reduction of accidents.
2. Coordination and cooperation between citizenship and official bodies.
3. Develop public support.
4. Advice and assistance to governmental agencies.
5. General expedition of traffic flow.
6. Traffic planning.

Comments:

1. Functions through 11 standing committees.

City: DETROIT, MICHIGAN
Name: Traffic Committee
Created by Ordinance. Official
9 members fixed by ordinance: 1. Deputy Commissioner of Police in Charge of Public Safety; 2. Supt. of Public Lighting; 3. General Manager, Dept. of Street Railways; 4. Secretary, City Plan Commission; 5. Corporation Council; 6. Commissioner of Public Works; 7. Traffic Engineer; 8. 2 Judges of Recorders Court

Compensation: None
Director or Chairman: Deputy Commissioner of Police in Charge of Public Safety

Activities:

1. Designate streets upon which there shall be no stopping, standing, or parking of vehicles or upon which there shall be stopping, standing, or parking for limited time.
2. Exclude or restrict stopping, standing, or parking on designated streets, or parts of streets, during certain hours.
3. Permit angle parking in designated places.
4. Establish one-way streets and other special routing of traffic.
5. Establish special prima facie speed limits.
6. Cause lines to be marked for direction of pedestrians and operators.
7. Prohibit left hand or right hand turns.
8. Designate fire routes.
9. Temporarily close any highway when required by public safety and convenience.
10. Designate stop intersections.
11. Designate through streets.
12. Designate commercial routes.
13. Designate loading zones to permit standing of commercial vehicles for loading and unloading merchandise and materials.
14. Designate building entrances, theater entrances, church entrances, or other special public entrances to permit stopping of vehicles for purpose of loading and unloading passengers.
15. Designate hotel zones to permit stopping or standing of vehicles for purpose of loading and unloading passengers or baggage.
16. Establish parking meter zones.

Comments:

1. Most members designate subordinates or assistants to represent them on the committee.
2. Consider all matters relating to traffic and advise with traffic engineering bureau and police department as well as other city departments.

City: GRAND RAPIDS, MICHIGAN
Name: Traffic Commission
Created by Ordinance. Official
7 members: Officials appointed by Mayor; others by City Commission: 1. City Manager; 2. Superintendent of police; 3. City Commission member; 4. Resident taxpayers (4 from Grand Rapids)
Director or Chairman: Any member
Compensation: None

Activities:

1. Advice to City Commission on matters relating to traffic and safety.
2. Investigate and make reports to Director of Public Safety and City Commission.
3. Coordinates official and public viewpoints on traffic.
4. Reviews proposed changes in traffic policy.

Comments:

1. Work coordinated with another group of 50 businessmen serving with local safety council.

City: MEMPHIS, TENNESSEE
Name: Traffic Advisory Commission
Created by Ordinance. Official
12–18 members, appointed by Mayor: 1. 12–18 citizens; 2. Ex-officio members: Commissioner of Fire and Police, Commissioner of Public Works, Commissioner of Public Service
Director or Chairman: Any member
Compensation: None

Activities:

1. Study general and specific traffic problems and recommend to Board of Commissioners.
2. Hear complaints and suggestions.
3. Hold hearings with reference to specific problems and recommend to Board of Commissioners.
4. Study public transportation systems.
5. Submit Annual Report.

City: NEW HAVEN, CONNECTICUT
Name: Traffic Commission
Created by City Charter. Official
6 members appointed by Mayor: 1. Chief of Police; 2. City Engineer; 3. Four Citizens
Director or Chairman: Any member designated by Mayor
Compensation: None

Activities:

1. Generally supervises services on many traffic matters.
2. Supervises work of traffic engineer.

Comments:

1. State statute designated Board of Police Commissioners as city traffic authority, thereby leaving traffic commission only advisory powers.

2. Budget for traffic engineer provided through traffic commission but traffic engineer appointed by Mayor and reports to Mayor.

City: NEW ORLEANS, LOUISIANA
Name: Officials' Traffic Safety Committee
Created by Ordinance. Official
9* members fixed by ordinance: 1. Commissioner of Public Safety; 2. Director of Div. of City Tr. Eng.; 3. Supt. of Schools; 4. City Attorney; 5. Judge of Traffic Court; 6. Prosecutor of Traffic Court; 7. Chief of Police; 8. Chief Adm. Officer of Police Dept. in direct charge of traffic control; 9. Chief Adm. Officer of each Parochial School System.
* Other administrative officials of the city. Plans are under way to amend the ordinance creating the committee to add citizen representatives, the city engineer, director of planning and zoning commission, superintendent of sewage and Water Board, etc.
Director or Chairman: Commissioner of Public Safety
Compensation: None

Activities:

1. Coordinate their present activities in their respective offices and jurisdictions, to the end of maximum effectiveness of each in accident prevention.
2. Take inventory at regular periods, by best means available, of status of their individual and collective efforts in traffic control.
3. On basis of said inventories, recommendations of Pres. Highway Safety Conference and other pertinent information, to formulate and submit to the people a long-range plan for traffic improvement, and to submit recommendations for improvement of said plan from time to time.
4. To execute elements of said plan after its approval by the people, each official in his own capacity, with approval and support of the citizens.
5. Each official in his own capacity to explain adequately to the public his actions under said plans, and the need therefor.

Comments:

1. This committee works closely with Metropolitan New Orleans Safety Council which provides citizens membership and which is formally designated by ordinance.

City: NEW YORK, NEW YORK
Name: Traffic Commission
Created by Ordinance. Official
7 members appointed by Mayor: 1. Exec. Dir. of Dept. of Tr. Engineering; 2. Police Commissioner; 3. Commissioner of Public Works; 4. Chairman, Triborough Bridge & Tunnel Authority; 5. Chairman, City Planning Commission; 6. Chairman, Board of Transportation; 7. Chief Engineer of Board of Estimate

Director or Chairman: Any member appointed by Mayor
Compensation: None

Activities:

1. Make rules and regulations for conduct of vehicular and pedestrian traffic; such do not become effective until filed with city clerk and published in City Record.
2. Determine design, type and location of signs, signals, markings and other control devices.
3. Recommend to Mayor the location, type and design of parking meters.
4. Recommend to Mayor design and location of highway lighting devices.
5. Prepare for Mayor comprehensive city traffic plan.
6. Collect and compile traffic data and prepare engineering studies.
7. Furnish Mayor detailed reports in regard to general traffic conditions.
8. Recommend methods ameliorating traffic conditions which cannot be remedied by rules and regulations.
9. Recommend amendments of regulations of city agencies affecting traffic when needed.
10. Recommendations and proposals for street improvements, location and design of off-street parking and loading facilities.
11. Coordinate efforts of public and private agencies and civic groups in traffic matters.
12. Analyze traffic accident records.
13. Conduct general safety educational activities.

Comments:

1. Traffic Commission intimately related to Department of Traffic Engineering.

City: PORTLAND, OREGON
Name: Traffic & Transportation Commission
Created by Ordinance. Official
11 members, appointed by Mayor: 1. 11 citizen members; 2. Ex-officio: Mayor, Commissioner of Public Safety, Commissioner of Public Utilities, Commissioner in charge Bureau of Traffic & Transportation, City Engineer, Traffic Engineer, Sr. Municipal Judge, Chief of Police, City Attorney
Director or Chairman: Any member
Compensation: None

Activities:

1. Recommend methods of alleviating traffic congestion.
2. Investigate and recommend on matters concerning operation of and services rendered by public utilities engaged in transportation.
3. Recommend ways of providing safety on streets and other public places.

4. Investigate and report on matters connected with vehicular traffic—public educational efforts; publicity on traffic hazards and safety precautions; cooperate with public schools in safety education.

Comments:

1. Work carried on largely through committees. These now include: Engineering, Public Information, Law Enforcement, Women's Activities, School Safety, Transit, Parking and Congestion, Terminals, Railroads, and Commercial Vehicle.

City: SPRINGFIELD, MASSACHUSETTS
Name: Traffic Commission
Created by Ordinance. Official
8 members, appointed by Mayor and Council: 1. Alderman; 2. 2 Councilmen; 3. Chairmen, Planning Board; 4. Chief of Police; 5. Chief of Fire Department; 6. Superintendent Streets and Engineering; 7. Traffic Engineer
Director or Chairman: Any member designated by Mayor
Compensation: None

Activities:

1. Issues taxi licenses.
2. Licenses for new or relocated bus routes.
3. Reviews applications and recommends taxi stands to Aldermen.
4. Cab inspections.
5. Review petitions for parking regulations.
6. Generally coordinates traffic engineering program.

Comments:

1. Commission created as integral part of Bureau of Traffic Engineering.

City: SACRAMENTO, CALIFORNIA
Name: Highway Safety Coordinating Committee
Created by Resolution. Official
Indefinite number of members, appointed by Mayor: Representatives from City Government
Director or Chairman: Any member
Compensation: None

Activities:

1. Very general coordinating and sponsorship duties.

Comments:

Formed at request of Pres. Highway Safety Conference to give public support to local traffic activities.